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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

SECOND SESSION

ON

H.R. 5653

AN ACT MAKING APPROPRIATIONS FOR ENERGY AND WATER DEVELOPMENT FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1985, AND FOR OTHER PURPOSES

PART 2 (Pages 441–1314)

DEPARTMENT OF ENERGY
FEDERAL ENERGY REGULATORY COMMISSION
U.S. NUCLEAR REGULATORY COMMISSION

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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

THURSDAY, MARCH 1, 1984

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:10 a.m. in room SD–192, Dirksen Senate Office Building, Hon. Mark O. Hatfield (chairman) presiding.

Present: Senators Hatfield, Abdnor, Domenici, Johnston, and Burdick; also present, Senator Warner.

DEPARTMENT OF ENERGY

OFFICE OF ENERGY RESEARCH

STATEMENT OF ALVIN W. TRIVELPIECE, DIRECTOR, OFFICE OF ENERGY RESEARCH

OPENING REMARKS

Chairman HATFIELD. The committee will come to order.

This morning we begin our examination of the fiscal year 1985 budget for the Department of Energy programs which are under the jurisdiction of the Energy and Water Development Subcommittee of the Appropriations Committee.

As our first witness, we want to extend a very special welcome to the Secretary of Energy, Donald Paul Hodel.

Mr. Secretary, we look forward to your statement and your oral presentation. After the committee has had an opportunity to examine and pose questions to you, we will hear from Martha Hesse, the Assistant Secretary for Management and Administration.

Mr. Secretary, Senator Johnston, the ranking member of this subcommittee, is still detained at the Foreign Operations Subcommittee hearing where I have been participating as well—Secretary Shultz is presenting his request for foreign aid—and he will be here shortly. I think rather than to have you make your statement at this time, the Senator, Mr. Warner of Virginia, has asked to participate in the committee session this morning and we are very happy to have him do so. Let us take care of that matter and then we will come back to your statement.

SOUTHEASTERN UNIVERSITIES RESEARCH ASSOCIATES PROGRAM

Senator WARNER. Mr. Chairman, I am indeed grateful to you and the members of the subcommittee to allow me to be present this morning.

The Secretary of Energy is accompanied by Dr. Alvin W. Trivelpiece, the Director of the Office of Energy Research. The purpose of their presentation with reference to the SURA program is to provide the first legislative record of a project for this accelerator that is in the President's budget. At the moment there is a reprogramming action that is essential to an orderly development of this program by the Department of Energy. Eventually the authorization will come before the committee on which I am privileged to serve, the Energy Committee. In the meantime, it is to the interest of the Department of Energy to have expeditious treatment of the reprogramming action and I think an orderly process would be to have some legislative record made.

I do not suggest at this time that the subcommittee go into it in any great detail. The Secretary could briefly allude to it and Dr. Trivelpiece could indicate to the Chair that he is prepared to submit for the record a response to a series of questions that I believe will prepare an adequate record on which the reprogramming decision can be made.

Chairman HATFIELD. Thank you, Senator Warner.

Do you wish to respond, Mr. Secretary?

Secretary HODEL. Mr. Chairman, I didn't understand what the Senator wanted.

Senator WARNER. Perhaps if you will just give us a paragraph description of what is in the President's budget, the need for this reprogramming, and a representation from Dr. Trivelpiece that he will very promptly respond for the record to certain questions that are put in today.

Secretary HODEL. Mr. Chairman, I haven't had the opportunity to discuss this. However, Dr. Trivelpiece, our Research Director and science advisor, is sitting beside me. Perhaps I could turn to him to do what the Senator has asked.

Chairman HATFIELD. I would indicate, too, that Dr. Trivelpiece is scheduled to be before this subcommittee on March 14 to present his formal testimony, and if he wishes to defer until that time responding, it is perfectly well to do so, otherwise, he can offer a brief response at this time.

SURA/CEBAF REPROGRAMMING

Dr. TRIVELPIECE. I would be delighted to provide answers to any questions you might have at this time for the record and to any specific questions on why this reprogramming is necessary. I would be glad to answer them. I could start off by saying that what we are asking for in this reprogramming is for the preliminary work that we would normally do in advance of submitting a request to the Office of Management and Budget as part of the President's annual budget in order to have an adequate determination of costs and schedules and the other technical elements of the project. This does not represent a commitment to the construction project, but it is the kind of preliminary studies we would do prior to the preparation of a submission as part of the President's annual budget.

Senator WARNER. In your judgment it is essential that this be done in a very timely fashion in order to better prepare the Secretary and other members and yourself of the Department in their presentation for authorization before the Senate Energy Committee.

Dr. TRIVELPIECE. Yes, sir.

Senator WARNER. And that is the reason for the timing of action on this particular program.

Dr. TRIVELPIECE. That is correct.

Senator WARNER. And it is a subject that has received strong bipartisan support here in the U.S. Senate. I will put in the record a letter to you, Mr. Secretary, reflecting the endorsement by a number of Senators.

Secretary HODEL. Thank you, Senator.

[The communications follow:]

LETTER FROM SENATOR HOLLINGS

FEBRUARY 14, 1984.

Dr. HARRY D. HOLMGREN,
Department of Physics and Astronomy,
University of Maryland, College Park, Md.

DEAR DR. HOLMGREN: Thank you for your recent letter regarding SURA's continuous electron beam accelerator.

I, too, am pleased that Secretary Hodel finally followed the advice of the Nuclear Science Advisory Committee and selected the CEBAF design. You and your colleagues deserve congratulations for your excellent work.

Please be assured that I will continue to work with other Southern Senators to see that SURA is fairly treated in the appropriations process.

With warm regards, I am

Sincerely,

ERNEST F. HOLLINGS.

LETTER FROM SENATOR LONG

FEBRUARY 13, 1984.

Dr. HARRY D. HOLMGREN,
President, Department of Physics and Astronomy,
University of Maryland, College Park, Md.

DEAR DR. HOLMGREN: This is in response to your recent correspondence concerning the funding of SURA's continuous electron beam accelerator (CEBAF).

I, too, agree that this project will greatly benefit education and research in science and technology for the Southeast and the Nation. Let me assure you that I will be watching closely to make sure the Department of Energy's budget and appropriation bills include moneys needed for CEBAF.

I am looking forward to hearing from SURA and members of the Virginia delegation on efforts to add additional funds for CEBAF's construction. I appreciate your taking the time to keep me informed on the progress of this project.

With every good wish, I am

Sincerely yours,

RUSSELL LONG.

LETTER FROM SENATOR WARNER, ET AL.

JULY 12, 1983.

Hon. DONALD P. HODEL,
Secretary of Energy,
Washington, DC.

DEAR MR. SECRETARY: We urge you to confirm the recommendations of the Panel on Electron Accelerator Facilities (Bromley Panel) and the Department of Energy/National Science Foundation (DOE/NSF) Nuclear Science Advisory Committee that the proposal of the Southeastern Universities Research Association (SURA) to develop a nuclear science electron accelerator laboratory (NEAL) be accepted and funded.

We were extremely pleased that these committees of some of America's most eminent physicists judged the SURA proposal superior to all others submitted. We understand that the technical quality of the design and the ability of SURA to develop the facility were given the greatest importance but that other factors were considered such as the impact of the proposed accelerator on graduate education and the ability to attract top, new personnel into nuclear physics. The NEAL will be the only facility of its kind in the world and will signal that the United States is serious about regaining its leadership in nuclear physics.

It is important to note that the panels did not evaluate the design of the SURA electron accelerator in a vacuum. The creativity and knowledge of the SURA scientists who designed and will operate the facility were an inseparable part of this decision as was the close relationship with the 23 member universities. To remove the SURA design from the scientists and the universities who conceived it would be a destructive rejection of the peer review and scholastic integrity of the Bromley Panel recommendation.

The president of the American Physical Society, Dr. R. E. Marshak, has stated that: ". . . the procedures used by the Bromley Panel were extremely careful and even-handed. . . The painstaking step-by-step procedures adopted are clearly a model of fairness and responsibility, and I urge that its carefully constructed recommendations be considered with equal care."

Mr. Secretary, we as U.S. Senators do not have the scientific expertise to evaluate the various electron accelerator proposals. We do recognize the critical importance of this decision in attracting top scientific talent to provide the best scientific advice possible.

The United States now faces serious international challenges to its economic prosperity and national security , and it is essential that we continue our pursuit of excellence in science and technology. If the Federal Government ignores the advice which it sought on the question of electron accelerators, the scientific community will question the productivity of making available its most highly qualified personnel to participate in objective review processes and recommend the best course of action for the Federal Government. The American scientific community certainly understands their international competition; the U.S. Government should heed their technical judgment.

Mr. Secretary, these two eminently qualified scientific panels recommended that the SURA proposal is a superior one which should be approved and funded. We urge you to confirm their advice. It is critical that you decide soon because we understand that your staff is withholding any research and development funds for SURA until you have made this decision.

The commitment of those of us from the SURA-member States to this project is an extremely strong one, as evidenced not only by the interest here in the Congress, but also by the contributions of the State and local governments and member universities. We will work with you to make this SURA proposal a reality.

With best wishes,

Sincerely,

John Warner.
Paul Trible.
Paula Hawkins
Jeremiah Denton
Charles McC. Mathias, Jr.
Strom Thurmond.
Paul Sarbanes.
Jesse Helms.
John P. East.
Lawnton Chiles.
Sam Nunn.
Russell Long.
Mack Mattingly.
Fritz Hollings.
Howell Heflin.

Senator **Warner**. That is quite adequate, Mr. Chairman, and I thank you for your courtesies.

Chairman **Hatfield**. We are happy to have you, Senator Warner.

We will be discussing this in some detail later. I know Senator Johnston is very interested in this issue, and I, as well, am interested because this is a request of the fiscal year 1985 budget and, therefore, the reprogramming should clearly be, as Dr. Trivelpiece has indicated, a noncommitment to the program and to project construction until there is an adequate congressional authorization giving full consent and support to the project. It may appear to be a rather unimportant technicality, but I think it is a very fundamental matter to follow the legislative process and not commit ourselves to a project through a reprogramming effort, a project that has not been authorized.

Secretary **Hodel**. Mr. Chairman, I hear you very clearly and I certainly agree it is a management responsibility as well, within the Department, to see to it that I don't find myself supporting what appears to be simply a study effort, which is, in fact, ultimately turned into a commitment for a project. We have more than a few opportunities for that kind of activity within the Department. I appreciate and support guidance from the committee on these issues as well.

Chairman **Hatfield**. Thank you, Mr. Secretary.

PREPARED STATEMENT AND PREPARED QUESTIONS FOR THE RECORD

Dr. Trivelpiece, we will have some additional questions for your response.

[The questions and answers follow:]

STATEMENT OF ALVIN W. TRIVELPIECE

Mr. Chairman and Members of the Subcommittee:

It is a pleasure to appear here today to present the FY 1985 budget request for the programs supported by the Office of Energy Research (ER). They include: High Energy and Nuclear Physics, Basic Energy Sciences, Magnetic Fusion Energy, Biological and Environmental Research, Energy Research Analyses, University Research Support, University Research Instrumentation and Multiprogram General Purpose Facilities. The High Energy and Nuclear Physics programs are under the General Science and Research appropriation. All of the other programs are under the Energy Supply R&D appropriation. The FY 1985 budget request for all ER programs is shown in Table 1.

This budget request reflects the goals and strategies set out in the Fourth National Energy Policy Plan (NEPP-IV), published in October 1983. As stated in NEPP-IV, the goal of our national energy policy is to foster an adequate supply of energy at reasonable costs. The strategies for achieving this goal are: (1) to minimize Federal control and involvement in energy markets while maintaining public health and safety and environmental quality, and (2) to promote a balanced and mixed energy resource system.

Table 1
Office of Energy Research
Summary by Program
($ in millions)
Budget Authority

	FY 1984 Estimate	FY 1985 Request
General Science & Research		
High Energy Physics	$480.0	$561.0
Nuclear Physics	159.0	183.6
General Science Program Direction	2.2	2.2
Subtotal	641.2	746.8
Energy Supply - R&D		
Basic Energy Sciences	$337.3	$419.5
Magnetic Fusion Energy	470.8	483.1
Biological & Environmental Research	183.9	189.1
Energy Research Analyses	2.9	3.0
University Research Support	5.5	9.2
University Research Instrumentation	4.0	6.0
Multiprogram General Purpose Facilities	42.1	39.0
Advisory & Oversight Program Direction	3.4	2.9
Policy and Management	1.3	0.5
Subtotal	$1,051.2	$1,152.3
Total ER	$1,692.4	$1,899.1[a]

[a] These estimates reflect $15.6 million for savings resulting from FY 1985 management initiatives.

NEPP-IV also stresses the need to: 1) increase our basic understanding of nature and matter, 2) advance the frontiers of scientific, and engineering knowledge that forms the basis for technological innovation, 3) assess the potential human health and environmental effects associated with development and use of energy technologies, and 4) transfer new knowledge to the private sector where it can be developed further and applied. The programs that I will discuss today accomplish all of these things. They do so through the research itself, through a variety of communications mechanisms such as publications, workshops and private sector access to laboratory facilities and, finally, through the training of graduate students who carry their knowledge of cutting-edge research into their careers after completion of their studies.

At this point I would like to discuss each of the programs mentioned above in some detail.

HIGH ENERGY AND NUCLEAR PHYSICS

The High Energy and Nuclear Physics programs contribute to DOE's implementation of NEPP-IV's goal and strategies by supporting the most basic long-term scientific research--that aimed at improving our understanding of the fundamental constituents of matter and energy and the basic forces in nature that control the interactions among those constituents. This research advances the frontiers of our scientific and technical knowledge and provides fundamental building blocks for technological innovation. Because the research is long-term and not initially applicable to any given energy technology, the private sector has no incentive to support research in high energy and nuclear physics.

The Department's High Energy and Nuclear Physics programs have long been important to the vitality and development of science and technology in the U.S. Through the efforts of its practitioners, this research has made vital contributions not only to energy resource development but to education, health, industry and national defense. Significant contributions to the economic growth and prosperity of the Nation have come directly from the results of the research, from technological spinoffs, and from the training of tomorrow's scientists through the involvement of university graduate students in carrying out the research. Through technology transfer, these ideas and people have made contributions in a variety of industries including medical instrumentation, control and instrumentation of industrial processes, and the production of nuclear energy. In FY 1985, the HENP programs will continue to increase our fundamental understanding of the physical world and assure that research results are available to those who might use them.

In this century, scientific investigation has focused on understanding the relationships among ever more fundamental constituents of matter, with the research frontier moving from atoms, to nuclei, to the constituents of nuclei (protons and neutrons) and recently to even more elemental subnuclear constituents, somewhat whimsically referred to as quarks and gluons. The Department funds approximately 90% of the High Energy and Nuclear Physics research that is carried out in the United States. The National Science Foundation supports the rest in a joint endeavor with the Department.

The High Energy and Nuclear Physics programs are closely related in terms of goals, the types of facilities and equipment used to reach these goals and the impact that research in one program has on the other. Although the two programs have related goals, they have quite different research emphases.

The Nuclear Physics program strives to attain a better understanding of the structure and properties of the atomic nuclei that comprise the cores of the atoms and the forces that govern their behavior. It also seeks to determine how the quark substructure of protons and neutrons influences the make-up and characteristics of nuclei (i.e., how do quarks act when they are imbedded in nuclei?). High Energy Physics research seeks to understand the nature and relationships among the fundamental forces of nature and to understand the ultimate structure of matter in terms of the properties and interactions of its basic constituents.

Although the focus of each of the programs is somewhat different, most experiments in both the High Energy and the Nuclear Physics programs depend on large experimental facilities that accelerate beams of particles to collide with stationary targets or other moving particle beams. These are required to probe the properties of atomic nuclei, in the case of Nuclear Physics, or to study elementary particles such as quarks in the case of High Energy Physics. The primary experimental technique used in both programs is to analyze the results of the collisions. Many entirely new forms of matter can be created in these collisions by means of a series of energy-to-matter transformations. The study of these dynamic phenomena then reveals the properties of the underlying building blocks and basic forces involved. In general, as the particles studied become more elementary, their component parts are bound together more tightly. Thus, larger, more powerful and complex accelerators, detectors and supplementary equipment are required to carry out the research.

Although progress in High Energy and Nuclear Physics is dependent on the availability of these forefront accelerator and colliding beam facilities, as well as on the sophisticated detectors that record the effects of particle collisions, these advanced facilities are only one facet of the program. Progress in both High Energy and Nuclear Physics features a continuing interplay of advancements in experiment, theory and technology. HENP experiments are done at the very forefront of theoretical and technical knowledge, and the range of experiments possible is determined by available technology. Physicists frequently have to invent unique equipment and technology to carry out the experiments of greatest importance. Great strides in technology advancement are now coming at the same time that our understanding in both fields of research is growing rapidly. Together, these advancements provide a clear view of the kinds of new experimental facilities that will be required to take advantage of the growing number of successes in recent years.

The large scientific facilities supported by the HENP programs are available to qualified scientists for experimental research on the basis of the merit of their scientific proposals. Approximately 75% of the research in High Energy Physics is done by university-based scientists who usually form collaborations with scientists from other universities or from DOE's laboratories. Typically, proposals from university and laboratory user groups for accelerator research time are evaluated by scientific program advisory committees which recommend for selection those proposals with the greatest scientific promise. The High Energy Physics program operates almost exclusively in this mode, while Nuclear Physics, in addition to national facilities, also supports dedicated accelerator facilities located on the campuses of four leading universities (Duke, Yale, Texas A&M, and the University of Washington) where research is primarily conducted by resident researchers and graduate students. To complement, interpret, and guide the experimental work, each program supports a vigorous theoretical research effort at universities and at the national laboratories.

HIGH ENERGY PHYSICS

Considerable progress has been made in recent years toward improving our understanding of energy and matter and their most elemental transformations. We have not only identified a growing number of particles, but have seen how they relate to one another and how they can be transformed during collisions with other particles in accelerator experiments. A long-standing goal of high energy physicists is to understand these diverse and complex phenomena by formulating a theory which would encompass all of the interactions of matter and energy revealed by their research. These "unified" and "grand unified" theories, as physicists call them, hypothesized over the last 10 years, imply that the diversity existing in the universe today may have evolved from a single force, or process, that existed only when the universe was formed some 20 billion years ago.

These theories aim at linking together, or unifying, the four known fundamental forces of nature and identifying the basic constituents, or building blocks, of matter. The electromagnetic force describes how atoms and molecules are formed and is the cornerstone to understanding chemistry, electronic communications and biological processes. The weak nuclear force describes processes such as the radioactive decay of nuclei. The strong nuclear force helps describe how the nucleons, and thus all nuclear matter, are held together. The gravitational force, perhaps the most familiar of the four forces of nature, explains such things as why rocks fall and planets move in their orbits. The basic constituents of matter are presently hypothesized to consist of "quarks and leptons." Quarks are thought to be the constituents of nuclear matter. Leptons are weakly interacting particles, like the electrons, muons, and neutrinos.

Recent research results have led to an increasingly better understanding of the forces of nature. That understanding is defined in theories that indicate that the weak nuclear and the electromagnetic forces are actually different forms of a single force--referred to as the electroweak force. Two U.S. physicists shared in the 1979 Nobel Prize for work on this unification. The 1980 Nobel Prize in Physics was also awarded to two U.S. physicists for work that is expected to contribute to unification theories that encompass the strong nuclear and electroweak forces. Eventually, it is postulated that the gravitational force will be incorporated into a super unification theory, bringing all of the basic forces into a unified framework.

Among the predictions of the new theories is that protons, which were previously thought to be absolutely stable, do eventually decay; and that neutrinos, among the most abundant particles in the universe and previously thought to be massless, could instead have a small mass. Special emphasis in the experimental program is focused on testing these and other predictions of the unified theories.

Advances in experimental research during 1983 were highlighted by the observation at CERN in Geneva, Switzerland of the long-sought particles (called "W" and "Z") which are the carriers of the weak nuclear force. The discovery was made by an international team of researchers which included research scientists from the U.S. The observation of these particles, each of which is almost a hundred times heavier than a proton, was critical to the theory of unification of the weak and electromagnetic forces which had predicted their existence. Significant progress has also been achieved in precision measurements of the results of collisions of high energy electrons and positrons at the Positron-Electron Project (PEP) and the Stanford Positron-Electron Asymmetric Ring (SPEAR) facilities at the Stanford Linear Accelerator Center. Teams of university and laboratory scientists have measured a surprisingly long lifetime of a particle thought to contain one of the heaviest quarks, and have observed the presence of new states of matter resulting from decays of particles containing "charmed" quarks. The long lifetime, interesting in itself, has also given new clues in the search for even heavier particles. One interpretation for the new states observed is that they could be made up entirely of the gluons that are thought to be the carriers of the strong nuclear force.

The experimental work in High Energy Physics is carried out primarily on the high energy accelerator and colliding beam facilities operated by the Department. In FY 1985, these include: the 30 GeV (billion electron volts) proton synchrotron, called the Alternating Gradient Synchrotron (AGS), at Brookhaven National Laboratory (BNL); the 1000 GeV superconducting magnet proton synchrotron at Fermi National Accelerator Laboratory (Fermilab); and the 32 GeV linear electron accelerator at the Stanford Linear

Accelerator Center (SLAC). SLAC also has two electron-positron colliding beam facilities for which the linear accelerator acts as the injector: the Stanford Positron Electron Asymmetric Ring (SPEAR) (4 GeV x 4 GeV) and the Positron-Electron Project (PEP) (15 GeV x 15 GeV). Each of these DOE accelerator centers provides a unique set of experimental capabilities, complementary to the others. As an ensemble they provide capabilities essential for a comprehensive forefront national research program in high energy physics. A major part of High Energy Physics funding is required to develop, maintain and operate the major accelerator and detector facilities at these laboratories.

Before I discuss the budget request, I would like to report a major technological achievement during this last year. The Energy Saver, the world's first high energy accelerator using superconducting magnets, has been brought into successful operation at Fermilab. The last superconducting magnet was installed in March 1983 and by early July the beam had been accelerated to 512 GeV, a world record energy. The accelerator is presently providing beam to experiments at 400 GeV. This energy will be increased to approximately 700 GeV in the near future. In FY 1985 the accelerator is expected to operate at energies near 1000 GeV. This is truly a major step in the development of superconducting magnet technology.

FY 1985 HIGH ENERGY PHYSICS BUDGET REQUEST

The FY 1985 request for the High Energy Physics program is $561.0 million, which consists of $381.6 million for Operating Expenses, $65.4 million for Capital Equipment and $114.0 million for Construction (Table 2).

Table 2
High Energy Physics
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses		
Physics Research	$ 99.5	$107.7
Facility Operations	161.0	182.1
High Energy Technology	82.0	91.8
	$342.5	$381.6
Capital Equipment	51.5	65.4
Construction	86.0	114.0
Total High Energy Physics	$480.0	$561.0

The FY 1985 request for Operating Expenses will permit an overall utilization level of the High Energy Physics accelerator facilities at about 55%, somewhat above the FY 1984 level. The request also provides continuing support for university and laboratory based research groups including accelerator experiments, non-accelerator experiments, and theoretical research. There will be continuing accelerator R&D activities at Fermilab and SLAC in support of ongoing construction projects.

The FY 1985 request for Operating Expenses also will provide for preliminary R&D studies for the next generation particle accelerator designated the Superconducting Super Collider (SSC). Construction of such a new facility was recommended by the High Energy Physics Advisory Panel (HEPAP). Specifically, HEPAP recommended as highest priority "the immediate initiation of a multi-TeV high luminosity proton-proton collider project with the goal of physics experiments at the earliest possible date." The SSC would provide a research capability in an unexplored domain for which there are no existing or planned facilities anywhere in the world and in which there is strong expectation of major research breakthroughs.

The Department has evaluated the HEPAP recommendation and decided to initiate an R&D program at various locations in FY 1984 to investigate key issues associated with construction of such an accelerator. The major emphasis in FY 1984 is on superconducting magnet R&D and on developing a reference design with a cost estimate based on credible assumptions about possible achievements in the R&D program. In FY 1985, preliminary R&D for the SSC will focus on development and evaluation of technical options for magnets and other accelerator components, development and validation of cost saving designs and fabrication techniques, consideration of accelerator design alternatives and trade-offs, and cost optimization studies.

The FY 1985 Capital Equipment request of $65.4 million provides a substantial increase above the FY 1984 level in order to meet some of the major needs associated with implementation of research programs using the major new research capabilities being provided by the Tevatron I and Tevatron II projects at Fermilab and the Stanford Linear Collider (SLC) at the Stanford Linear Accelerator Center. This increase in Capital Equipment funding in FY 1985 is essential for the effective utilization of the U.S. High Energy Physics facilities and for the health of the U.S. High Energy Physics program for the remainder of the 1980's.

The request for Capital Equipment gives priority to Fermilab for the new secondary beam lines and detector systems needed to implement the 1000 GeV research program associated with the Tevatron II fixed target program and for work on detectors needed for the Tevatron I proton-antiproton colliding beam research program. Priority is also given to SLAC for work on detectors for electron-positron colliding beam research at the SLC; to the university program to meet the needs of experiments at the U.S. laboratories and at the Large Electron Positron (LEP) facility at the CERN Laboratory in Geneva, Switzerland; and for non-accelerator experiments.

In addition to programmatic equipment needs, the High Energy Physics program provides for the general purpose equipment requirements for all DOE programs at the Brookhaven National Laboratory.

A total of $114.0 million in Construction funding for High Energy Physics projects is requested in FY 1985. The projects are listed in Table 3. A major portion of this request is for continued construction of the Stanford Linear Collider ($60.5 million). The primary goal of this project is to develop and demonstrate the technical feasibility of using linear accelerators with precisely controlled, high intensity and highly focused beam pulses to provide high rates of electron-positron collisions at energies far beyond those that will be affordable for circular colliders. SLC also will give U.S. physicists early access to the important physics which can be studied with copious production of the Z^0 particle.

Table 3
High Energy Physics
Budget Authority
($ in millions)

Construction	Prior Years	FY 1985 Request	TEC	Completion Date
Tevatron I (81-E-218)	$ 54.1	$ 21.3	$ 82.5	FY 1986
Tevatron II (82-E-206)	37.8[a]	12.0	49.0	FY 1985
Stanford Linear Collider (84-ER-133)	34.3[b]	60.5	112.0	FY 1986
Accelerator Improvement Project (85-R-100)	N/A	10.0	N/A	FY 1987
General Plant Projects (85-R-101)	N/A	10.2	N/A	FY 1987
Total Construction		$114.0		

a/ Includes $0.8 million for PE&D
b/ Includes $2.3 million for PE&D

The request also provides for completion of the Tevatron II project at Fermilab ($12.0 million) and continuation of Tevatron I ($21.3 million) at Fermilab.

Funds are requested for Accelerator Improvement Projects ($10.0 million), which are critical on an annual basis to maintain the scientific effectiveness and the operating reliability and efficiency of the accelerator and colliding beam facilities. The request also provides for an improved level of General Plant Projects ($10.2 million). Within the GPP request, emphasis is placed on the needs at BNL, since the High Energy Physics program provides funding for the general purpose needs of all DOE programs at this laboratory.

NUCLEAR PHYSICS

Nuclear knowledge, techniques, instruments, and applications pervade American society. These serve as the basis for our national defense strategy, for therapeutic and diagnostic medical applications, for the generation of electricity with nuclear reactors (fission now and fusion in the future), and for a large and diverse array of applications in industry. The behavior of nuclei and nuclear matter determine the physical properties of our universe--from its creation from a primordial "soup" of energy and elementary particles, to the reactions which power our sun, to the makeup of our planet. Thus, basic nuclear research is both a central component in our Nation's long-term investment in its technological future and an essential foundation to any basic understanding of the world about us.

The Nuclear Physics program is a comprehensive program of interdependent experimental and theoretical investigations of atomic nuclei. The goal of the program is to understand the interactions, properties, and structures of atomic nuclei and nuclear matter at an elementary level and to gain knowledge of the fundamental forces of nature by using nuclei as a proving ground.

Experimental and theoretical investigations are leading nuclear scientists to conclude that a new level of understanding of atomic nuclei is achievable. This optimism arises from evidence that: (1) the mesons, protons, and neutrons which are inside nuclei are themselves composed of quarks and gluons and (2) the theory called quantum chromodynamics (QCD) can be developed into a theory which both describes correctly the interaction between quarks and gluons and is also an exact theory of the strong nuclear force. These concepts will be important drivers of basic nuclear research and will determine facility needs in FY 1985 and years beyond.

As is the case with High Energy Physics, the Nuclear Physics program depends upon the operation of large and complicated accelerator facilities which provide a variety of projectile beams required for forefront nuclear research. Seven existing accelerator facilities are operated by the Nuclear Physics program as national facilities whose beam time is made available to all the Nation's scientists on the basis of the scientific merit and technical feasibility of proposed research projects. The national facilities are: the Clinton P. Anderson Meson Physics Facility (LAMPF) at Los Alamos National Laboratory (LANL); the Bates Linear Accelerator Center at the Massachusetts Institute of Technology (MIT); the SuperHILAC/Bevalac at Lawrence Berkeley Laboratory (LBL); the Holifield Heavy Ion Research Facility at Oak Ridge National Laboratory (ORNL); the 88-inch Cyclotron at LBL; the Tandem/Linac Facility at Argonne National Laboratory (ANL); and the Double MP Tandem Van de Graaff facility at Brookhaven National Laboratory (BNL).

Long range planning for the needs of nuclear physics research is performed in concert with the National Science Foundation (NSF), which has a smaller, complementary program in this area, and with input from external and internal reviews of specific research areas and from the scientific community itself. In cooperation with the Department of Energy and NSF, the Nuclear Science Advisory Committee (NSAC) has developed a long-range plan for basic nuclear research in the United States -- "A Long Range Plan for Nuclear Science" (December 1983). This long-range plan is based upon a comprehensive review of scientific advances and opportunities which have emerged since development of the previous long-range plan dated December 1979.

The 1983 Long Range Plan reaffirms NSAC's April 1983 recommendation that construction of a 4 GeV, continuous electron beam facility should be initiated as soon as possible, and it identifies a longer term, high priority need for a relativistic heavy ion collider facility. From very different aspects, both the electron facility and the heavy ion collider share the common scientific goals of understanding quantum chromodynamics as an exact theory of the strong nuclear force and understanding the ways in which the quarks inside protons and neutrons determine the behavior and makeup of nuclei. Also, in the interaction of very energetic colliding beams of nuclei, extreme conditions of energy density will occur, conditions which previously existed only in the early instants of creation of the universe. The energy densities will be so great that transitions to new phases of nuclear matter seem likely. If these bright prospects can be realized, a new level of knowledge of atomic nuclei will be achieved. In accord with the Long Range Plan, the FY 1985 construction request provides for initiation of construction of a 4 GeV, continuous electron beam facility at Newport News, Virginia and for a significant advancement in our capability for heavy ion nuclear research at Brookhaven National Laboratory.

FY 1985 NUCLEAR PHYSICS BUDGET REQUEST

The FY 1985 request for the total Nuclear Physics program is $183.6 million, which consists of $144.6 million for Operating Expenses, $13.7 million for Capital Equipment and $25.3 million for Construction (Table 4).

Of the Operating Expenses request of $144.6 million, $73.7 million is needed for operation of the existing national and dedicated accelerator facilities to maintain the overall utilization of the national accelerator facilities at 90% of the FY 1984 utilization levels. An additional $1.1 million is required for operation of the new SLAC injector discussed later in my testimony.

The FY 1985 Operating Expense request will allow emphasis to be given to exploitation of new research capabilities provided by successful completion of construction projects in FY 1984 and FY 1985. These include: (1) the Argonne Tandem/Linac Accelerator System (ATLAS) to provide heavy ion beams to investigate how colliding nuclei exchange mass, energy, and spin; (2) the Bates Electron Accelerator recirculator project (MIT) which provides electron beams for precision electron-nuclear scattering studies at higher energies than previously available; and (3) a new injector at SLAC to provide high energy, precisely pulsed electron beams to examine the magnetic properties of nuclei and for exploratory experiments into the ways in which quarks influence the makeup and behavior of nuclei. In the FY 1985 Operating Expenses request, $60.5 million is planned for experimental research and $9.3 million for theoretical research.

Table 4
Nuclear Physics
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses		
Medium Energy Nuclear Physics	$ 65.0 a/	$ 72.0
Heavy Ion Nuclear Physics	47.0	49.8
Low Energy Nuclear Physics	13.0	13.5
Nuclear Theory	9.0	9.3
	$134.0	$144.6
Capital Equipment	11.3	13.7
Construction	13.7 b/	25.3
Total Nuclear Physics	$159.0	$183.6

a/ Includes $3.0 million which was provided under Defense Programs for LAMPF facility operations.

b/ Does not include $5.0 million proposed reprogramming from the HEP ISABELLE project to the Tandem/AGS Heavy IonTransfer Line project.

Of the total FY 1985 Operating Expenses request, 26% is planned as direct support to universities, consisting of off-campus experimental research; operation of Bates and the four dedicated on-campus accelerator facilities; research at on-campus facilities; research and development on the 4 GeV, continuous electron beam facility by the Southeastern Universities Research Association; and theoretical research. Additional university support in an amount almost equal to the direct support is provided through the accelerator centers to support experimental research and operate the accelerators.

As the various Nuclear Physics research programs move into new scientific areas, there is a continuing need to develop new detection instrumentation, upgrade the capabilities of existing instruments, improve the efficiency and sophistication of data acquisition and analysis systems, and improve the performance and beam characteristics at the major Nuclear Physics accelerator facilities. In general, the more complex and precise experiments require the development of entirely new techniques.

The increasing complexity of Nuclear Physics experiments requires larger and more powerful data acquisition and analysis systems. The FY 1985 Capital Equipment request for Nuclear Physics is $13.7 million. This request includes equipment to be used in the first heavy ion experiments at the Alternating Gradient Synchrotron (AGS) at the Brookhaven National Laboratory. At the Lawrence Berkeley Laboratory, the start of fabrication of a major new instrument, the Dilepton Spectrometer, is planned for FY 1985. This instrument will allow researchers to investigate new states of nuclear matter created in very high energy collisions between nuclei. Capital Equipment funds also are needed to exploit the capabilities of the Holifield Heavy Ion Research Facility at Oak Ridge National Laboratory and the new Argonne Tandem/Linac Accelerator System (ATLAS) at the Argonne National Laboratory. At the Bates Linear Accelerator Facility at MIT the upgrade of a beam line which feeds

Table 5
Nuclear Physics
Budget Authority
($ in millions)

Construction	Prior Years	FY 1985 Request	TEC	Completion Date
Univ. Accelerator Upgrade (84-ER-110)	$8.0	$ 11.0	$ 19.0	FY 1987
Tandem/AGS Heavy Ion Transfer line (84-R-123)	$5.0a/	5.3	10.3	FY 1986
Accelerator Improvements Projects (85-R-200)	N/A	3.5	N/A	FY 1987
General Plant Projects (85-R-201)	N/A	3.5	N/A	FY 1987
Continuous Electron Beam Accelerator Facility (85-R-203)	0	2.0	b/	b/
Total Construction		$25.3		

a/ Proposed reprogramming from ISABELLE construction project (78-10-6)
b/ The total estimated cost and exact construction dates are under review. The FY 1985 request provides for architect-engineering work, detailed design, and preliminary site work.

three magnetic spectrometers will provide new research capabilities and increased efficiency.

In addition to programmatic equipment needs, the Nuclear Physics program provides for the general purpose equipment requirements for all DOE programs at the Lawrence Berkeley Laboratory.

A total of $25.3 million in Construction funding for Nuclear Physics projects is requested in FY 1985. These projects are listed in Table 5. A major feature of the FY 1985 Nuclear Physics program is the initiation of construction of the Continuous Electron Beam Accelerator Facility project (CEBAF) at Newport News, Virginia. This will be a major facility employing an electron linear accelerator complex capable of delivering intense, continuous electron beams in the energy range from 500 million to 4 billion electron volts. The intensity (number of particles per second) of the beam in combination with multi-GeV energy and uniquely high duty factor (continuous rather than pulsed beam) will make this facility unmatched in the world. The CEBAF will have the capability of investigating a crucial class of problems facing nuclear physics today, namely, understanding.the relationship between the traditional and emerging descriptions of nuclear dynamics. The aim is to synthesize the traditional picture and the emerging view of an underlying structure of quarks and gluons into a unified description.

In FY 1985, $2.0 million in Construction funds will be used for architectual and engineering services, for minor site work, and for design beyond the conceptual level in order to establish a reliable cost estimate for the CEBAF project.

The Nuclear Physics Construction budget also requests funds for the ongoing construction of the University Accelerator Upgrade Project at the University of Washington and Yale University ($11.0 million) and for the Tandem/AGS Heavy Ion Transfer Line project at

Brookhaven National Laboratory ($5.3 million). The FY 1985 request completes funding for these construction projects. The University Accelerator Upgrade Project at the University of Washington and Yale University will maintain the forefront nuclear research capabilities of two of America's leading universities.

The objective of the Brookhaven project is to transport beams of nuclei as massive as sulfur (32 atomic mass units) from the existing Double MP Tandem Facility to the Alternating Gradient Synchrotron (AGS) for acceleration to energies of 15 billion electron volts per atomic mass unit. This project will provide an exciting new capability for research in heavy ion collisions in a new higher energy region, and is an excellent complement to Bevalac's existing lower energy (1 to 2 billion electron volts per atomic mass unit) but much higher mass (up to uranium at 238 atomic mass units) beams. Research at the Bevalac shows that concentrations of mass and energy do occur in energetic collisions of massive nuclei. Tandem/AGS Heavy Ion Transfer Line beams will extend our capabilities into regions in which the quarks inside nuclei will be violently forced together, possibly producing a transition of nuclear matter into new forms.

The request also provides $3.5 million for Accelerator Improvement Projects (AIP) at Nuclear Physics facilities taking into account the needs of the recently completed facilities now being operated, and $3.5 million for an improved level of General Plant Projects (GPP) with particular emphasis on the needs at LBL, where this program provides funding for the general purpose needs of all DOE-sponsored programs.

GENERAL SCIENCE PROGRAM DIRECTION

The FY 1985 budget request for General Science Program Direction is $2.2 million. These funds are required to provide for the salaries, benefits, travel and other expenses associated with 35 full-time equivalents in the Office of the Associate Director for High Energy and Nuclear Physics and associated support staff required to administer these programs.

Now let me turn to the Basic Energy Sciences program.

BASIC ENERGY SCIENCES

Over the years the United States has developed a tradition of leadership in science and technology which has made us a model for developing nations throughout the world. All of our national goals -- better health and quality of life for all our people, vigorous economic growth, energy self-sufficiency, national security, space exploration, etc. -- involve technological advances that depend on basic research. The principal product of this research is knowledge, the foundation from which new ideas and concepts emerge and on which important decisions can be made.

The goal of the Basic Energy Sciences (BES) program is the production of scientific and engineering knowledge for use by the Government and the private sector in developing new concepts, materials and processes for use in energy exploration, production, and conversion, The knowledge that results from BES-sponsored research, thus, becomes a vital part of the body of information on which developments in the applied energy technologies rest. Basic Energy Sciences' research in the physical, biological and mathematical sciences is carried out largely by scientists at universities and national laboratories. An important benefit that results from supporting research at universities is the technology transfer that occurs when graduate students carry their knowledge of cutting edge research to their new employment environment after completion of their studies. In addition to universities and laboratories, BES also maintains ties with industry. Industry representatives participate in workshops and in reviewing research proposals, and in membership on advisory panels to the laboratories. They also use the specialized research facilities supported by BES. Through these and other mechanisms, the results of BES-sponsored research are continually made available to industry and the academic community.

Although the pursuit of research to broaden the technology base needed for identified energy technology options is important, even more important is the need for basic research unfettered by preconceived notions of which technologies will be important several decades from now, so that new, currently unidentified options may emerge. The following examples of research results in FY 1983-1984 that have enhanced energy alternatives or improved our understanding of energy-related phenomena are illustrative of the benefits to be gained from research in the basic energy sciences.

These accomplishments include:

o The preparation of simple, low-cost, yet very high efficiency solar cells from single crystal silicon. This method involves the novel application of two new technologies: ion implantation using a relatively inexpensive glow discharge source, and pulsed laser annealing.

o The development of a new thin film photoelectrode that can convert visible light to electricity or, in the photo-assisted electrolysis of water, can generate hydrogen. Many advances reported in photoelectrochemical energy conversion in the past two years have depended on ultraviolet light; this electrode can make use of the more abundant visible spectrum of the sun.

o The demonstration that the structure and surface hardness of ceramics can be modified and controlled by means of ion implantation to produce surface hardnesses that are greater or less than that of the original ceramic. The new technology involved gives us the ability to systematically alter the structure and properties of ceramic surfaces.

o The determination, based on research carried out under the Geosciences subprogram, that two recent volcanic eruptions, Mt. St. Helens in 1980 and El Chichon in 1982, have had and will have very different effects on climate. The effects of these eruptions have been sorted out through measurements of solar radiation reaching the earth during the past few years. The differences result from differing behavior of sulfur dioxide released by the eruptions in the formation of aerosol particles in the stratosphere.

- The measurement for the first time of fusion reaction rates using subatomic particles called mesons as reaction catalysts. The resulting reaction yield of neutrons is high and the application of the concept to provide high intensity neutron sources is possible.
- Progress in genetic engineering that makes it possible to transfer pieces of DNA carrying specific genes into host plants without causing the development of tumors in those plants, which brings closer the time when it should be possible to introduce desirable traits into plants to improve the species and, thus, the production of biomass which ultimately could be converted to energy.

Improvements in existing energy technologies and the development of new energy technologies invariably come from the application of just such new scientific knowledge. Given increasing international competition in science and technology, the need for a strengthened national basic research effort is clear. External blue ribbon advisory groups have repeatedly recommended that DOE increase its funding of basic energy research and have called for the Basic Energy Sciences program to be given a larger role in developing the needed technology base for the different energy supply and conservation options. Our FY 1985 budget request for Basic Energy Sciences is consistent with these recommendations.

An important aspect of Basic Energy Sciences research activities is the support of a number of national user research facilities. Recently, several facilities were brought on-line and each promises to open whole new areas of research possibilities. These facilities include: the National Synchrotron Light Source (NSLS) at Brookhaven National Laboratory; the Intense Pulsed Neutron Source (IPNS) at Argonne; the 1.5 MeV High Voltage Electron Microscope and the Atomic Resolution Microscope, located at Lawrence Berkeley Laboratory's National Center for Electron Microscopy; and the Combustion Research Facility (CRF) at Sandia Livermore. These facilities recently brought on-line together with existing ones (e.g., the Stanford Synchrotron Laboratory), require significant increases in funding for their effective operation to assure their availability to meet the wide demand for experimental time by the research community. A complete list of BES user facilities is contained in Table 6. The Basic Energy Sciences program also is undertaking a new effort to provide needed access to supercomputers for ER-supported researchers. I will discuss that effort later in my testimony.

Table 6--BASIC ENERGY SCIENCES FACILITIES

High Flux Beam Reactor (HFBR)--Brookhaven National Laboratory
National Synchrotron Light Source (NSLS)--Brookhaven National Laboratory
Intense Pulsed Neutron Source (IPNS)--Argonne National Laboratory
High Voltage Electron Microscope-Tandem Facility--Argonne National Laboratory
Oak Ridge Electron Linear Accelerator (ORELA)--Oak Ridge National Laboratory
High Flux Isotope Reactor (HFIR)--Oak Ridge National Laboratory
Combustion Research Facility (CRF)--Sandia National Laboratories, Livermore
National Center for Electron Microscopy--Lawrence Berkeley National Laboratory
Stanford Synchrotron Radiation Laboratory (SSRL)--Stanford University
Spallation Neutron Research Facility (SNR)--Los Alamos National Laboratory

FY 1985 BUDGET REQUEST

The FY 1985 BES budget was developed to focus on two principal objectives. The first is to maintain a strong core program -- this involves equipping, supporting and encouraging the scientists involved in our current program activities, and training new, younger scientists, to expand the forefront of knowledge in areas likely to be important to future energy technologies. The second objective is to provide for the operation of existing, unique facilities important to research in the U.S. while, at the same time, developing and constructing and providing for the future operation of needed new facilities. Additionally, in selected subprograms, opportunities for exploiting new, emerging areas, that have been identified as having great potential importance to energy, will be pursued.

The FY 1985 request for the BES program is $419.5 million. This budget which is composed of $348.3 million in Operating Expenses, $31.1 million in Capital Equipment and $40.1 million in Construction funds, maintains the needed continuity of the FY 1984 program (Table 7).

The total Operating Expenses request for FY 1985 is $348.3 million, an increase of 18% over the corresponding FY 1984 level. Most of this increase is for cost of living increases for each BES subprogram, and to meet increasing costs of facility operations. A table (Table 8) has been attached which summarizes all of the increases for FY 1985.

Table 7
Basic Energy Sciences
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses		
Materials Sciences	$125.1	$141.5
Chemical Sciences	75.5	80.9
Nuclear Sciences	37.9	49.8
Applied Mathematical Sciences	14.6	28.2
Engineering and Geosciences	19.0	20.8
Advanced Energy Projects	9.1	10.8
Biological Energy Research	10.6	12.5
Program Direction	4.0	3.8
Subtotal	$295.8	$348.3
Capital Equipment	24.3	31.1
Construction	17.2	40.1
Total Basic Energy Sciences	$337.3	$419.5

Table 8
Basic Energy Sciences
Explanation of Budget Changes from FY 1984 to FY 1985
($ in millions)

1984 Appropriation enacted	$337.3
Operating Changes	
Programmatic increases (described in detail below)	
Materials Sciences	+16.4
o Provides for increased funds for facility operations, reactor fuel element requirements and additional requirements associated with the advanced materials research initiative.	
Chemical Sciences	+5.4
o Provides increases for meeting facility commitments and reflects internal adjustments required to meet ongoing research commitments.	
Nuclear Sciences	+11.8
o Provides increases to meet commitments for the National Nuclear Data Program, an expansion to the Heavy Ion Fusion Program, and to meet facility commitments.	
Applied Mathematical Sciences	+13.6
o Provides increases for a significant expansion in basic research in scientific computing at national laboratories, universities and private research institutions. In addition, experimental computing capabilities are being established to support the exploration of new concepts in large scale scientific computing. Also, increase is provided for expanding access for Energy Research scientists to state-of-the-art computing capability.	

Other Operating Changes	+5.3
o Provides increases in Engineering and Geosciences, Advanced Energy Projects, Biological Energy Research, and Program Direction necessary for expansion of those research activities holding the greatest promise.	
Subtotal Operating Changes	52.5
Capital Equipment Changes	
o Programmatic increase in each of the subprograms will be provided to meet facility requirements, to support the recently assigned responsibility for General Purpose Equipment at Argonne National Laboratory, and to support new requirements in areas of increasing research.	+6.8
Subtotal Capital Equipment Changes	6.8
Construction Changes	
o Programmatic increases for General Plant Projects (Argonne National Laboratory, Ames Laboratory, Notre Dame University, and Stanford University); Accelerator Improvement Projects; Kansas State Univeristy Ion Collision Physics Facility; National Synchrotron Light Source; Center for Advanced Materials and Stanford Synchrotron Radiation Laboratory Enhancement.	+22.9
Subtotal	22.9
1985 budget request	$419.5*

*The FY 1985 budget request reflects $3.0 million for savings resulting from management initiatives related to administrative processes.

Of the total BES request for Operating Expenses for FY 1985, almost 40% will be spent to operate or carry out research at the major BES facilities. These are used not only by the Department, but also by other Federal agencies, by industry and by university researchers. These facilities represent a national resource that is essential for a sound national research program. The budget request will ensure continued operation and access to these facilities in FY 1985. Equally important, we have provided additional funds in FY 1985 to operate the new state-of-the-art facilities that are only now becoming fully operational and that I mentioned earlier in my testimony.

The FY 1985 budget increase will also support promising new research that we believe will have a significant impact on energy. Two items in the request exemplify research areas with great potential. These are the materials sciences research initiative, which was started in 1984, and the budget request for the Applied Mathematical Sciences subprogram. Let me first discuss the materials initiative.

The United States' economic health and national security require the maintenance of a commanding lead in high technology and reduced vulnerability to critical and strategic imported materials. In response to this challenge, an advanced materials research initiative was first proposed in FY 1984. The current budget initiative consists of a Center for Advanced Materials (CAM) at Lawrence Berkeley Laboratory (LBL), improvements at the Stanford Synchrotron Radiation Laboratory and an expansion of activities at the National Synchrotron Light Source at the Brookhaven National Laboratory.

Planned activities in FY 1984 and the FY 1985 budget request are consistent with the recommendations of an ad hoc panel composed of leaders from industry, academia and the national laboratories. This panel was established in April 1983 to review the initial proposal for a center for advanced materials. Those recommendations were to continue the initiative, but to decouple the synchrotron radiation facilities from the advanced materials research and treat them separately. The panel made a number of constructive recommendations which have been factored into this year's request. A new National Academy of Sciences study of the requirements for additional major facilities currently is underway. Decisions to proceed further with construction of major new facilities will await the results of that study.

The ongoing advanced materials research activity is being organized to provide maximum benefit to the Nation. Industry will participate in the design of the CAM program to assure that the research addresses America's high-technology needs. For example an advisory board composed of scientific leaders from industry, universities, and Federal laboratories will advise the Director of LBL, home of the proposed Center for Advanced Materials, on the scientific program directions for CAM. An Industrial Fellows program has been established to provide joint LBL-industrial participation in basic research studies of mutual interest to LBL and the scientists' parent companies. An initial workshop on general concerns regarding industrial participation was held in 1983 where issues and follow-on activities were agreed upon. Four CAM workshops for the initial research areas have been held with strong industry participation.

The second expanded research activity I would like to highlight is in our Applied Mathematical Sciences subprogram for which we have requested $29.7 million in FY 1985. Supercomputers are playing an increasingly important role in many of the Department of Energy's programs. Every generation of large scientific computers has had a significant positive impact on the ability of the DOE laboratories to meet their mission goals. Each new machine has improved the laboratories' abilities to more accurately model complex physical phenomena, thus improving their productive capability and reducing the number of expensive tests now required.

Evidence of this improved capability has already been seen in the design and testing of nuclear weapons and more recently in magnetic fusion research. As they have become available, DOE programs in fundamental physical sciences are just beginning to use supercomputers as "experimental" devices for theoretical calculations. The need for large scale scientific computers is emerging in high energy physics, condensed matter research, and chemical and biological theory. Calculations of subatomic particle confinement, critical phenomena in alloy solidification and superconductors, thermophysical properties of chemical mixtures, and properties of long-chain polymers are providing insight into the basic properties of matter.

The Applied Mathematical Sciences subprogram consists of two activities. The first (Supercomputing Research) is aimed at funding research in mathematical and computational sciences that is critical to the use and development of future supercomputer systems. The second activity (Energy Science Advanced Computation) will provide network access to large-scale scientific computing required by several Departmental programs and to the basic research activities funded by the Office of Energy Research in universities, national laboratories and industry.

The goal of the Supercomputing Research activity is to advance our understanding of the fundamental concepts of mathematics, statistics, and computer science underlying complex mathematical models of the key physical processes in energy systems. Much of the scientific research and development effort throughout DOE programs is focused directly on analytical and numerical modeling of these physical processes. Basic research in the relationships among the mathematical formulation of scientific and engineering problems, the creation of algorithms for solving these problems and the architectures of parallel computers designed to implement these algorithms makes a significant contribution to the development of future energy systems.

The Energy Science Advanced Computation activity is aimed at meeting the immediate needs for supercomputer access by the Department of Energy's High Energy and Nuclear Physics, Biological and Environmental Research, and Basic Energy Sciences programs. The substantial contribution to solving the national problem of providing access to supercomputers for energy researchers will help to ensure that the U.S. maintains its lead in computational sciences related to supercomputer technology.

CAPITAL EQUIPMENT

The Capital Equipment request for FY 1985 is $31.1 million, an increase of $6.8 million over FY 1984. This level of funding is necessary to meet ongoing research requirements, additional commitments associated with the newer facilities, and additional equipment for those selected areas of promising research. Examples of equipment to be purchased include an analytical electron microscope at Los Alamos National Laboratory, neutron scattering equipment, synchrotron radiation equipment and electron microscopy equipment. Two significant items in our request for FY 1985 deserve special note. The first, is a $1.5 million request for peripheral computer equipment which is an integral part of the Applied Mathematical Sciences expanded effort. Secondly, the BES request includes $2.0 million for the General Purpose Equipment needs at the Argonne National Laboratory site. Beginning in FY 1985, this responsibility has been transferred to BES from the Office of the Assistant Secretary for Nuclear Energy.

CONSTRUCTION

Table 9 details the Construction request for FY 1985. Three of the projects are associated with our materials initiative. Another new project will provide an expanded atomic physics capability through the construction of an ion collision physics facility. In conjunction with existing capabilities, this facility will allow researchers to study the atomic physics of a range of ions at energies unmatched in the world. The project will be located at Kansas State University and will be jointly funded by DOE and the

Table 9
Basic Energy Sciences
Budget Authority
($ in millions)

Construction

	Prior Years	FY 1985 Request	TEC	Completion Date
Accelerator Improvement Projects (85-ER-401)	$ 1.3	$ 2.4	$ 2.4	FY 1986
General Plant Projects (85-ER-400)	.4	5.8	5.8	FY 1986
NSLS Beam Line & Support, BNL (84-ER-111)	2.5	10.0	19.7	FY 1986
Center for Advanced Materials, LBL (84-ER-112)	1.8	10.8	40.2	FY 1988
Stanford Synchrotron Radiation Laboratory Enhancement (85-ER-402)	1.2	9.1	12.9	FY 1986
Kansas State University Ion Collision Physics Facility (85-ER-403)		2.0	3.4	FY 1987
Total		$40.1		

University, with the University providing the conventional construction necessary to house the new facility. The remaining construction funds are requested for General Plant Projects (GPP) and Accelerator Improvement Project (AIP) requirements. The request in FY 1985 includes a significant increase in GPP funds as a result of the BES program assuming GPP funding responsibility for the Argonne National Laboratory. Previously this funding was provided by the Assistant Secretary for Nuclear Energy. This item accounts for $5.0 million of the $5.8 million GPP request in FY 1985.

This completes my summary of the BES program. I would now like to discuss the Magnetic Fusion Energy program.

MAGNETIC FUSION ENERGY

As a long-term energy option, magnetic fusion could become a principal energy source in the next century. Its potential attractiveness is based upon such characteristics as an inexpensive, vast and secure fuel reserve, environmental and safety aspects that appear to be acceptable, and promising results from scientific research in the U.S and abroad. Fusion development also contributes important technology advances that provide near-term benefits in fields as diverse as superconducting magnets, high power accelerators and radiofrequency systems, advanced materials development, and mathematical methods for computers.

The goal of Federally-supported, long-term R&D is to develop promising technological concepts to the point where private enterprise can reasonably assess their risks. Accordingly, the Department's Magnetic Fusion Energy (MFE) program is developing the technical data base required for the private sector to determine the commercial potential of fusion. The program is being carried out in such a way as to maintain an international leadership role for the U.S. in fusion research.

In support of the technical data base goal, the program's intermediate objectives are the development and operation of facilities in which fusion research is conducted, the definition of an attractive reactor confinement concept and the development of critical technologies required to demonstrate engineering feasibility. This work is being done through a base program of research in magnetically confined plasmas, including tokamaks, tandem mirrors, and other supporting concepts. The objective is to select a suitable fusion plasma core for an eventual fusion reactor.

The two leading confinement concepts being pursued are a closed magnetic confinement system referred to as a toroidal system and an open system referred to as a mirror system. The toroidal system uses doughnut shaped devices wrapped with electrical coils that produce a closed magnetic field.

There are several kinds of toroidal devices including tokamaks, stellarators, reversed field pinch systems, and compact toroids. Tokamaks are the devices being examined most extensively both in the U.S. and internationally. The majority of the tokamak research is conducted at the Princeton Plasma Physics Laboratory (PPPL), GA Technologies, Oak Ridge National Laboratory (ORNL), and the Massachusetts Institute of Technology (MIT). The second leading concept is an open magnetic confinement system referred to as a mirror system. Mirror devices have cylindrical center sections with large magnets at each end that reflect the plasma particles toward the center to prevent their escape from the open ends. The major laboratory for mirror research is the Lawrence Livermore National Laboratory (LLNL). Additional mirror experiments are conducted at MIT, the University of Wisconsin, and TRW.

Presently the tokamak is the most developed confinement concept followed by the more recently developed tandem mirror. The tokamak program will be ready by late 1986 to attempt production of reactor grade plasmas using deuterium/tritium fuels at the Tokamak Fusion

Test Reactor (TFTR), which recently began operation at Princeton. The Mirror Fusion Test Facility (MFTF-B), which is under construction at Livermore, will investigate by the late 1980's the physics of a reactor-grade mirror plasma using deuterium as a fuel. There has been general agreement among the fusion scientific community and advisory groups that a next logical program step, generally designated as the Tokamak Fusion Core Experiment (TFCX), should produce a near reactor grade ignited plasma in a long pulse device. There is further agreement that sufficient technical information and program capability now exist to begin designing this next device. Systems studies of various TFCX options are now underway, with the Princeton Plasma Physics Laboratory and the Fusion Engineering Design Center playing the major roles. The results of these studies will be factored into a DOE decision concerning the device that follows TFTR.

During FY 1983-84, fusion research on the leading concepts and on technology development led to many technical accomplishments. In tokamak research:

- The most outstanding tokamak experimental achievement in 1983 was the attainment of a value for the confinement parameter (defined as the product of density and energy confinement time) above the minimum value required for proof of fusion's scientific feasibility. This result was obtained in the Alcator C confinement device at MIT at densities several times greater than those expected in a fusion reactor.

- The TFTR device, which is designed to achieve energy breakeven, thus proving fusion's scientific feasibility, began experimentation for the first time in FY 1983. Initial experimental results have been extremely encouraging with world record energy containment times of nearly 300 milliseconds.

- The Princeton Large Torus at PPPL demonstrated that the tokamak plasma current can be started and maintained using radiofrequency waves. Although the current drive efficiency in these groundbreaking experiments, when extrapolated to reactor densities, was a little too low for true steady state reactor use, these results provide an expanded experimental foundation for designing tokamak reactors with sufficiently long pulse lengths that loss of strength in construction materials due to cyclic fatigue is not a problem.

In the mirror confinement concept:

- The existence of a thermal barrier was confirmed for the first time in the Tandem Mirror Experiment Upgrade at Lawrence Livermore National Laboratory. This long-sought achievement greatly improves the potential economics of mirror reactors.

- A major accomplishment at the Tandem Mirror Experiment (TMX) device at LLNL showed the technical feasibility of the "Yin-Yang" concept. This configuration consists of two "C" shaped interlocking magnets which produce a magnetic mirror. The TMX tests were carried out successfully without excessive particle escape or the plasma instabilities that could lead to reactor instabilities. Also, for the first time, TMX startup was achieved using only radiofrequency plasma heating, the startup technique most likely to be used in a reactor.

In the area of technology development, progress was made with the demonstration of the efficient production and release of tritium in a solid tritium breeding experiment. Such solid breeders would improve the safety of fusion systems. The processing of tritium is being studied in the Tritium Systems Test Assembly. Other accomplishments included the completion of a test to show how large amounts of lithium can be handled safely, the setting of several world records in the development of components needed to heat fusion plasmas (i.e., neutral beam injectors, gyrotron tubes, pellet injectors), and continued progress in developing component hardware that will be needed for fusion experiments. The Large Coil Test Facility (LCTF) at Oak Ridge National Laboratory and three of the six large superconducting magnets (coils) for use in the facility were completed. Two of the 40 ton coils were installed in the LCTF vacuum tank in preparation for an initial two coil test in early 1984.

During the last year, international cooperation continued to play an important role in the United States' fusion program. Areas of cooperation included sharing research data, joint planning of comprehensive research programs in selected areas, and joint funding and hardware support for major scientific and technological projects. The European Community and Japan are major participants in these activities. Active scientific information exchanges also are continuing with researchers in the Soviet Union.

In September 1983 senior government officials responsible for fusion policy matters participated in the Versailles Summit of Industrial Nations to consider strengthening joint planning and collaboration in fusion energy research. Bilateral activities also were pursued in 1983 and included the signing of an agreement for a joint effort by the U.S. and Japan in the area of materials irradiation activities. Experimental time on the ORNL High Flux Isotope Reactor and use of the Oak Ridge Reactor facilities will be involved in this research. In addition, DOE and the Japanese Atomic Energy Research Institute extended for five years their joint project in tokamak research on the Doublet III facility at GA Technologies.

Finally, an agreement of cooperation between the U.S. and the Peoples Republic of China (PRC) was signed in 1983.

The strategy used to implement the ongoing MFE program has three phases: scientific feasibility, product definition and product development. The current plan is to attempt to demonstrate scientific feasibility in the TFTR in late 1986. This will occur when energy breakeven is attained (i.e., when the amount of energy released from fusion reactions equals the amount of energy required to heat the plasma).

As confidence increases in our ability to accomplish the objective of the first phase, the program has begun to address the issues of the product definition phase. The objective in this second phase is to identify a reactor core plasma confinement concept that is credible in both a scientific and technological sense. This objective is in keeping with the program's goal of developing the technical data base required for the private sector to determine the commercial potential of fusion. There are two major thrusts in the program to achieve this objective. On one hand, we must confront the issues of burning plasmas in a TFCX-like facility. On the other hand, we must strengthen the search for innovative magnetic configurations that have improved potential for practical application. The third phase, product development, would begin after selection of a fusion plasma concept.

FY 1985 BUDGET REQUEST

The FY 1985 budget request for Magnetic Fusion Energy is $483.1 million. This represents an increase of $12.3 million over the FY 1984 level. The request includes $417.2 million for Operating Expenses, $33.4 million for Capital Equipment funds and $32.5 million for Construction projects (Table 10).

Table 10
Magnetic Fusion Energy
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses	$396.5	$417.2
Capital Equipment	37.8	33.4
Construction	36.5	32.5
Total	$470.8	$483.1

At current funding levels, the program will continue physics research aimed at developing the two most advanced concepts, tokamaks and tandem mirrors, as well as a technology development program to support the base scientific program. In addition, support is provided for developing alternate concepts which contribute to the general base of technical knowledge underlying the main concepts. The requested level of funding will allow us to address the key physics issues related to heating, confining, and controlling a plasma as well as the reactor technology and design issues associated with a long pulse ignited tokamak. The technology issues include plasma production, reactor components, and system designs. Existing facilities will be used to pursue key technical issues of confinement physics and engineering development. Together, these physics and technology research efforts will provide a base program moving toward the objective of developing a commercially attractive reactor concept.

The Magnetic Fusion Energy budget is organized into five interrelated functional areas that form the basis of a unified and balanced effort to conduct the research and development necessary to define a practical fusion product. The Confinement Systems and the Applied Plasma Physics subprograms, working in conjunction, provide the physics base for the MFE program. In the near term, the primary driving force of that program flows from the experiments conducted in the Confinement Systems subprogram, with its dual focus on toroidal confinement systems and mirror confinement systems. The Applied Plasma Physics (APP) subprogram analyzes these results, develops plasma physics theories and models to explain the experimental results and suggests directions for additional investigations. Based on this information, the APP subprogram also initiates experimental and theoretical investigations of basic physics problems related to alternate confinement concepts and develops diagnostic instruments for use by the Confinement Systems subprogram.

Using information developed by the above subprograms, the Development and Technology subprogram develops components and systems for use in near- and mid-term fusion experiments as well as long-term generic materials development. This subprogram also performs conceptual design studies for fusion power reactor concepts. These design studies serve to identify component and system development needs that must be undertaken to prepare for the eventual commercialization of fusion.

In carrying out the assignments of the physics and technology tasks, needs for major new facilities are identified from time to time. The Planning and Projects subprogram provides for construction of major new facilities and fabrication of auxiliary components for these facilities. Finally, the Program Direction subprogram includes the funding to cover salaries, benefits, travel, and associated expenses of the Headquarters Office of Fusion Energy. The proposed budget levels for these areas are indicated in Table 11.

In Confinement Systems, Operating Expenses funds of $154.1 million are provided to support toroidal systems and $42.1 million to support mirror systems. A major portion of the toroidal systems budget provides for the cost of conducting experimental operations on existing devices including: Alcator C at MIT, the Princeton Large Torus/Princeton Bean Experiment (formerly the Poloidal Divertor Experiment) at Princeton, and Doublet III at GA Technologies. In addition, funds will be used to prepare the TFTR for the world's first demonstration of magnetic fusion scientific feasibility by achieving energy breakeven in 1986. Fabrication of the Advanced Toroidal Facility at ORNL and modification of the Doublet III facility in cooperation with the Japanese to enhance the capability of this machine will continue in FY 1985.

Table 11
Magnetic Fusion Energy
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses		
Confinement Systems		
Toroidal Confinement Systems	$144.2	$154.1
Mirror Confinement Systems	43.9	42.1
Applied Plasma Physics	76.8	84.5
Development & Technology	78.3	79.6
Planning and Projects	48.7	52.8
Program Direction	4.6	4.1
Subtotal	$396.5	$417.2
Capital Equipment	37.8	33.4
Construction		
Fusion Materials Irradiation Test Facility	0.0	3.0
Mirror Fusion Test Facility-B	30.0	20.1
General Plant Projects	6.5	9.4
Subtotal	$ 36.5	$ 32.5
Total	$470.8	$483.1

In mirror confinement systems, the funds will be used to support the operation of the Tandem Mirror Experiment-Upgrade at LLNL, the first full year of operation on TARA at MIT and several other smaller devices to extend the technical data base of tandem mirrors. Preparation for the operation of MFTF-B will also be initiated in FY 1985. Mirror confinement systems also includes support for the Elmo Bumpy Torus (EBT) concept which involves toroidally linked mirrors. Work on EBT will be directed toward continued studies of fundamental issues of physics (e.g., electron cyclotron heating and confinement) in support of the tokamak and tandem mirror programs.

The Operating Expenses budget request for the Applied Plasma Physics subprogram is $84.5 million. This includes support for fusion theory, experimental research on smaller scale tokamaks and mirrors, development of new diagnostic techniques required to understand experimental behavior, development of supporting concepts with potentially superior reactor prospects and operation of the Magnetic Fusion Energy Computer Network which provides all the large scale computing capability used by the fusion program for data analysis, theoretical modeling and design.

The Development and Technology subprogram will be supported in FY 1985 at a level of $79.6 million in Operating Expenses. This will include work on necessary plasma and reactor technologies as well as design of reactor systems. A conceptual design for a long pulse ignited tokamak will be carried out by redirecting efforts from within the program. Specific technology development issues include plasma heating; plasma fueling; impurity and exhaust control; first wall, structure and heat flux materials; blanket and shield systems; superconducting magnets; and remote maintenance. The major facilities for technology development which will be funded in FY 1985 include the Large Coil Test Facility and Rotating Target Neutron Source II Facility at ORNL and the Tritium Systems Test Assembly at LANL.

The Planning and Projects subprogram Operating Expenses request is $52.8 million. This includes completion of work on the Tokamak Flexibility Modification project for TFTR to ensure achievement of the basic TFTR objectives. An increase is provided for development support and fabrication of auxiliary components on MFTF-B which will allow for experimental startup in the third quarter FY 1987. Funding is also requested to provide the necessary development support on the Fusion Materials Irradiation Test Facility (FMIT).

The FY 1985 level for Magnetic Fusion Energy Program Direction is $4.1 million. These funds are required to provide for the salaries, benefits, travel, and other expenses associated with 66 full-time equivalents.

CAPITAL EQUIPMENT

The request for capital equipment is $33.4 million. This represents a decrease of $4.4 million in funding support and provides a level commensurate with the operating program described above. These funds are used to support the execution of the research program. Most of these funds will be used to procure hardware to enhance the effective and efficient utilization of the fusion experimental devices. The remainder of the funds are used to maintain existing equipment or upgrade and replace obsolete equipment.

CONSTRUCTION

The Construction budget provides $3.0 million for FMIT, $20.1 million for the MFTF-B, and $9.4 million for General Plant Projects (GPP) (Table 12). FMIT will provide the capability to determine the effects of the fusion reactor neutron environment on candidate materials for future fusion reactors. The FMIT funding provides for the restart of construction activities and is predicated on international funding being available. MFTF-B is a thermal barrier tandem mirror device which will be the largest experimental facility in the world capable of investigating the mirror fusion concept. The requested funding for MFTF-B is based upon completion of facility construction in the fourth quarter of FY 1986. The increase in GPP funding of $2.9 million reflects the institutional requirement to reduce the overall backlog of general plant projects at Oak Ridge National Laboratory.

Let me turn now to the Biological and Environmental Research program.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

The Biological and Environmental Research (BER) program represents the Nation's only long-term research effort specifically focused on energy-related health and environmental issues. There are two major goals of this research program. The first is to provide, through basic and applied research, sound, scientific data required to reduce the health and environmental uncertainties associated with the development of energy technologies and weapons systems required to meet the Nation's future energy and national security needs. The second goal is to develop new applications of nuclear science and technology for use in the diagnosis and treatment of human diseases.

Table 12
Magnetic Fusion Energy
Budget Authority
($ in millions)

Construction	Prior Years	FY 1985 Request	TEC	Completion Date
Mirror Fusion Test Facility-B	$217.5	$20.1	$246.6	FY 1986 (4th qtr.)
Fusion Materials Irradiation Test Facility	44.7	3.0	77.5 1/	FY 1988 (4th qtr.) 1/
General Plant Projects	N/A	9.4		
Total Construction		$32.5		

1/ U.S. funds only. $67.0 million of anticipated foreign contributions, based on an assumption that an agreement is reached with foreign participants for them to fund 2/3 of the remaining construction costs, results in a total cost of $144.5 million.

This research program began 35 years ago to look at ways of measuring radiation, understanding the major processes that move radionuclides back through the environment to humans, and investigating how radiation affects human health. Now, a number of years later, it is apparent that many of the same biological questions that have been investigated in radiation-related research must also be addressed with respect to the effects of energy-related chemicals on human health (e.g., what is the impact of wastes from synthetic fuels on mutation rates and cancer incidence, on reproductive functions and on critical organ systems like the lungs and bone marrow). The same processes in the environment, the same interactions at the cellular level, and the same types of damage to DNA and other cell components are characteristic of other energy-related pollutants as well.

Information obtained as a result of this research program has provided the basis for a wide range of applications, including developing cost-effective protection standards for the nuclear industry, providing reliable, comprehensive data on the effects of fallout from weapons testing at the Nevada Test Site and the Marshall Islands, and developing strategies for control of emissions from processes used for conversion of coal to synthetic oil and gas.

The Nuclear Medicine program has changed the practice of medicine by developing techniques and instrumentation critical to the diagnosis and treatment of human disease. By exploiting the Department's unique capability in high energy physics, radiation chemistry and isotopes separation, the BER program has shown that it is feasible to use a broad array of radioactive and stable isotopes, labeled pharmaceuticals and radiation sources in the diagnosis and treatment of human disease and in biomedical research.

The BER program employs multidisciplinary "teams" of individuals in specialized facilities that have come to be regarded as national resources for research in the biomedical and environmental area. For example, in FY 1984 other Federal agencies and other DOE programs are investing over $100 million to use BER's facilities to conduct research important to achieving their goals. Nearly one third of the research supported by the BER program is conducted on academic campuses.

Over 200 BER-funded scientists in DOE laboratories hold academic appointments and serve as an important resource in the formal education of the Nation's scientists, engineers, and physicians. Many of the research projects supported at the laboratories also serve as vehicles for the training of pre-doctoral students as well as post-doctoral investigators.

The BER program places heavy emphasis on basic research. It evaluates the health consequences of energy activities within the context of the overall environment and at all levels of biological organization. It focuses on long-term generic issues rather than near-term process-specific questions which industry and regulatory agencies are better able to address. Most importantly, it takes an anticipatory rather than a regulatory approach toward the identification and solution of potential health and environmental problems; that is, it tries to identify the potential issues or problems in advance and determine the magnitude of the effect, if any, so these problems can be eliminated or controlled.

Because of the long-term nature of much of the BER research and the challenges of designing and implementing research that will yield timely and cost-effective information, there is a need for outside expert advice in program planning and evaluation. On November 22, 1983, the Health and Environmental Research Advisory Committee was chartered by the Department to meet that need. The expert advice obtained from the Committee will help us shape the strategic long-term planning necessary to establish research priorities, identify funding requirements, determine proper program balance and identify opportunities regarding interagency cooperation and industrial participation.

FY 1985 BUDGET REQUEST

The budget request for FY 1985 for the Biological and Environmental Research program is $189.1 million. Within this budget, $178.1 million is for Operating Expenses, $8.0 million is for Capital Equipment, and $3.0 million is for Construction (Table 13). Funding by various areas is shown in Table 14. I would like to take a moment now to summarize the FY 1985 request.

Table 13
Biological and Environmental Research
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses	$173.2	$178.1
Capital Equipment	8.3	8.0
Construction	2.4	3.0
Total	$183.9	$189.1

Table 14
Biological and Environmental Research
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Late Effects on Health & Envir. of Energy Development & Use		
Source and Dose Determination	$ 10.2	$ 10.3
Environmental Fate & Behavior	28.3	32.7
Health Effects	62.6	57.3
Basic Biology	22.9	28.2
Risk Analysis	1.8	0
Nuclear Medicine	19.7	20.7
Carbon Dioxide Research	12.5	13.4
Program Direction	3.6	3.5
Facility Operations	22.3	23.0
Total	$183.9	$189.1

A major objective of the BER research program is to understand and to reduce the potentially harmful effects on humans and the environment that are associated with energy technologies. In order to estimate health effects, we must first be able to determine the exposure received by humans or the environment. The Source and Dose Determination program activity, with an FY 1985 budget request of $10.3 million in Operating Expenses, conducts research to improve techniques to measure human exposure to ionizing radiation and to energy-related chemicals, to develop new measurement instrumentation and to define the physical and chemical nature of biologically active agents associated with energy technologies. These latter studies provide the data necessary to understand how these agents move through the environment and to estimate human exposure to them.

Once the source of a pollutant and its biologically active agents are identified, the Environmental Fate and Behavior program activity focuses on the pathways and mechanisms by which these agents move through the environment. With an FY 1985 budget request of $32.7 million in Operating Expenses, this activity includes atmospheric, aquatic and terrestrial research that will contribute to our ability to determine the probability of human exposure and the potential impact on human health and the environment. In FY 1985 we intend to mount a research program to investigate how changing the emissions of the SO_2 and NO_x that eventually enter storm clouds might affect the acidic deposition (acid rain) that falls from those clouds. We will be particularly concerned with whether a given reduction in emissions from the source will result in a proportional reduction in rain acidity over ecologically sensitive regions. If successful, the results of this research will have significant implications for the design of effective and economical emission reduction strategies.

The Health Effects program activity, for which $57.3 million in Operating Expenses is requested in FY 1985, is aimed at developing a solid base of knowledge to increase our understanding of human health risks that may result from exposure to ionizing radiation or to energy-related chemicals. Using some of the techniques developed in the Source and Dose Determination program activity, this activity emphasizes research on cancer, inheritable defects and other delayed or late occurring health effects that may be associated with chronic, low dose exposures. This comprehensive program of health effects research is composed of a family of interrelated studies of humans, animal species and molecular and cellular systems.

Research in Basic Biology, for which $28.2 million in Operating Expenses is requested in FY 1985, is aimed at developing an understanding of the generic biological mechanisms that underlie human health effects of radiation and energy-related chemicals. To achieve this objective, research is carried out in structural biology, molecular biology and cell biology. To take advantage of new opportunities provided by recent advances in molecular and cellular biology and related fields, our basic research efforts will be expanded and refocused in FY 1985. There will be decreased emphasis on studies in bacterial and other lower level biological systems (such as yeast) and additional resources will be applied to ongoing and new investigations using mammalian cells, with specific emphasis on human cellular systems. There will be increased emphasis on improving the basis for extrapolation of experimental data to humans; and a strong program in DNA damage and repair will exploit recent advances to focus on a better understanding of human DNA repair capacity and its significance for human health.

The development and application of nuclear techniques for diagnostic purposes has changed the practice of medicine by reducing the need for invasive procedures and exploratory surgery. Our Nuclear Medicine Applications subprogram, for which $20.7 million in Operating Expenses is requested in FY 1985, has played an important role in these developments and continues to do so.

In FY 1985, the Nuclear Medicine Applications program will continue to provide new and improved sources of medically useful radioisotopes, new radiopharmaceutical agents, and improved instrumentation; and to demonstrate the feasibility of these various applications in clinical medicine. Once feasibility is established, these new technologies, instruments, and isotopic materials are taken over by the private sector for manufacture and distribution for patient diagnosis and treatment or by other research agencies or institutions to be used for the study of specific diseases.

In addition to research on radionuclides for medical use, considerable work will continue to produce existing stable isotopes for use in biomedical research and medicine, to improve instrumentation for their detection and measurement and to evaluate the feasibility of using new stable isotopes in medical research and diagnosis.

Research would also be supported to provide information necessary to evaluate the feasibility of using neutron capture techniques for the treatment of cancer; synchrotron light for improved diagnosis of coronary artery disease; heavy ions for the treatment of brain lesions; and shaped radiofrequency electromagnetic fields to treat cancer and abnormalities of the eye.

Within the Federal Government, the Nuclear Medicine Applications mission and DOE's facilities for conducting research in this area are unique. Liaison is maintained with Federal agencies (principally the National Institutes of Health and the Food and Drug Administration), the radiopharmaceutical industry, and the medical community regarding the requirements and the effective use of these techniques in medical research and practice.

The goal of the Carbon Dioxide Research program, which is budgeted in the BER program but managed by the Basic Energy Sciences program, is to develop a sound, quantitative atmospheric carbon dioxide knowledge base to aid in energy policy decision making. We must improve our understanding of the fundamental scientific relationships between CO_2 concentration and climate. This can only be accomplished by increased data collection, improved measurements and development of reliable models. The FY 1985 budget request of $13.4 million in Operating Expenses for the Carbon Dioxide research program provides for completion of the State of the Art and Statement of Findings reports. These reports, scheduled for publication in early 1985, will delineate what is known, unknown and uncertain about atmospheric CO_2, possible CO_2-induced climate changes and CO_2 vegetation effects. This effort will provide a better understanding about the long-term implications of CO_2 and will redefine the research necessary to provide a sound base for policy decisions.

In FY 1985, research into the effect of other trace (greenhouse) gases will be carried out. These gases, such as methane, freon and nitrous oxide, act similarly to CO_2 in affecting the return of radiation to space. Recent studies have indicated that these gases may have an effect ranging from half to equal that of CO_2's effect on the climate. Thus, in the analysis of climate effects from CO_2, these other gases must be included or a significant error could occur in our estimation of the magnitude and timing of climate change.

The FY 1985 budget request does not include funds for the Risk Analysis subprogram. A number of risk analysis documents have been produced. They currently are being reviewed and will be completed in FY 1984.

The national laboratories and other specialized laboratories (e.g., Inhalation Toxicology Research Institute, the Environmental Measurements Laboratory) supported by the BER program represent an impressive national resource of skilled investigators, advanced major scientific instrumentation and exceptional, specialized research facilities. They provide the ability to address the diversity of research issues previously described while resulting in additional benefits to the scientific community at large.

But these facilities require continued commitment to operate, equip, and maintain them. The FY 1985 request for Facilities Operations includes $12.1 million in Operating Expenses for diverse special resources, including cyclotrons and reactors, environmental research parks and measurement laboratories as well as advanced spectrometers, electron microscopes, synchrotron light sources, and flow cytometers.

A Capital Equipment request of $8.0 million is required to maintain state-of-the-art capability for ongoing research and for equipment to initiate new research efforts.

The FY 1985 Construction request of $3.0 million is required to support the program's General Plant Project needs including the Pacific Northwest Laboratory landlord responsibility. These General Plant Projects will provide facilities for conducting critical research programs, contribute to greater efficiency, eliminate health and safety hazards, and will reduce maintenance and operational costs.

I would now like to discuss the several ER outlay programs that are related to my statutory responsibilities to advise the Secretary on DOE energy R&D programs, the non-weapons multiprogram laboratories and the education and training of scientists and engineers.

ADVISORY AND ASSESSMENT ACTIVITIES

Within the Office of Energy Research, the Office of Field Operations Management (FOM) and the Office of Program Analysis (OPA) support the Director's advisory responsibilities. The Office of Field Operations Management provides support with regard to oversight of the laboratories and energy-related manpower development and training activities. This Office has developed several management tools used by the Department in administering its laboratories and R&D facilities across the country. It also continues to manage the University Research Support, the University Research Instrumentation and the Multiprogram General Purpose Facilities programs, all of which I will discuss shortly. The

Office of Program Analysis, on the other hand, provides independent and objective program analyses and technical assessments under the Energy Research Analyses program. The FY 1985 budget request for these four programs is shown in Table 15.

Table 15--ENERGY RESEARCH ANALYSES, UNIVERSITY RESEARCH SUPPORT, UNIVERSITY RESEARCH INSTRUMENTATION, MULTIPROGRAM GENERAL PURPOSE FACILITIES BUDGET AUTHORITY

($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses		
Energy Research Analyses	$ 2.9	$ 3.0
University Research Support	5.5	9.2
University Research Instrumentation	4.0	6.0
Construction		
Multiprogram General Purpose Facilities	42.1	39.0

ENERGY RESEARCH ANALYSES

With an FY 1985 budget request of $3.0 million, the Energy Research Analyses program provides the Department with a capability for independent analyses of its technical needs and opportunities. It is carried out by the Office of Energy Research (ER) through studies, workshops, panels, and other mechanisms that allow the Department to make use of the best talent available from the industrial and academic sectors as well as the national laboratories. The specific functions of this program include assessing DOE's long range technology base and ongoing R&D programs, providing coordination and direction for interagency activities such as acid rain, coordinating resolution of major technical issues and research policy developments, and providing support to DOE advisory groups such as the Energy Research Advisory Board.

Recent accomplishments in the area of technical assessments included completion of two major program assessments, one of university and laboratory research projects in the Office of Fossil Energy's Enhanced Gas and Oil Recovery Program and the other of the accomplishments of ER's Biological and Environmental Research (BER) program. The latter assessment documented tangible contributions to the public made by the BER program. A narrative of these accomplishments is now available.

Assessments of research needs and priorities regarding photovoltaic cells and the solar thermal and geothermal programs were also completed. These independent reviews by outstanding researchers provided peer guidance on the most fruitful directions for future DOE research. An assessment was made of solar and building control research projects supported by DOE at the National Bureau of Standards. This work was found to be of high quality and appropriate for support by the public sector. Finally, an assessment of the need to continue the DOE High Altitude Sampling Program was completed.

OPA continued to represent DOE on the Interagency Task Force on Acid Precipitation and to coordinate the DOE acid precipitation research program with other Federal agencies. In FY 1983, DOE and the Environmental Protection Agency entered into a Memorandum of Understanding (MOU) initiated by OPA. The MOU formalized the joint assessment efforts of the two agencies and established the Acid Deposition Assessment Staff to which OPA continues to provide manpower and financial support. In addition, OPA conducted extensive technical contributions to documents used by those who formulate the Administration's acid rain policy.

The FY 1985 budget request would provide up to four technology assessments depending on their complexity and depth and up to four program assessments. Technical coordination and guidance will continue in the areas of acid rain and civil remote land sensing; liaison responsibilities will continue with the International Energy Agency to maintain annual reviews of energy R&D priorities, programs and technology base. The program will also provide independent peer review of technical or research subjects as requested by principal Secretarial Offices or the Director of

Energy Research, and will continue to support the Energy Research Advisory Board.

UNIVERSITY RESEARCH SUPPORT

The University Research Support Program (URS) provides a budget and management focus for a small number of specialized research and manpower development activities which help strengthen the capabilities of both universities and the Department's laboratories to carry out longer range scientific and technical research. Through these interrelated efforts, the Department is working to:

o Maintain and strengthen university-based energy research and manpower development efforts in selected high priority energy research fields.

o Utilize the unique resources of the national laboratories (equipment, instrumentation, and personnel) to assist university faculty and students to carry out advanced research and related training.

o Increase the number of students including women and minorities pursuing professional level degrees in energy-related science or engineering.

o Enhance the quality of the scientific/technical workforce in the Department's national laboratories.

The URS program, with an FY 1985 budget request of $9.2 million in Operating Expenses, consists of two major subprograms (Table 16). The first subprogram, University/National Laboratory Cooperative Research, is directed at strengthening the capabilities of both universities and national laboratories as major energy research performers in the conduct of long range energy research. Many of the activities supported within this subprogram involve joint efforts between university and laboratory-based researchers. With a FY 1985 budget request of $8.4 million, this subprogram supports both University Laboratory Cooperative Research and University Reactor Fuel Assistance. This latter activity is aimed at ensuring

Table 16
University Research Support
Budget Authority
($ in millions)

	FY 1984 Estimate	FY 1985 Request
Operating Expenses		
University/National Laboratory Cooperative Research		
University Laboratory Cooperative Research	$ 3.5	$ 6.5
University Reactor Fuel Assistance	1.5	1.9
Subtotal	$ 5.0	$ 8.4
Energy Manpower Development		
Energy Manpower Assessment	$ 0.3	$ 0.5
Energy Education & Training	0.2	0.3
Subtotal	$ 0.5	$ 0.8
Total University Research Support	$ 5.5	$ 9.2

that a continuing fuel supply is available for operation of university research reactors.

We are requesting a significant increase ($3.0 million) for the University Laboratory Cooperative Research activity. This program serves as an essential bridge, and will strengthen the ties, between the laboratory and university communities. Laboratories are important complementary resources in preparing students for future research careers. This budget request will allow us to double the number of undergraduate students supported in summer research programs. It also will allow us to develop additional cooperative research programs involving university faculty and graduate students and laboratory scientists.

The second subprogram, Energy Manpower Development, with a FY 1985 budget request of $0.8 million in Operating Expenses, combines two manpower-oriented activities. The Manpower Assessment activity conducts assessments and analyses of the supply and demand of manpower for both current and future energy R&D programs; and Energy Education and Training supports activities directed at encouraging secondary school students to pursue energy-related science and engineering programs at the college level.

The FY 1985 budget request of $9.2 million in Operating Expenses will allow these programs together to:

- o Support approximately 3000 student and faculty research participation appointments and special training activities at the Department's national laboratories and major contractor facilities,
- o Refuel up to six university research/training reactors and support approximately 18 reactor sharing projects,
- o Update manpower assessments for future professional level manpower requirements (e.g., scientists/engineers) for Departmental research programs,
- o Support cooperative projects with universities, industry and the Department's national laboratories through the Prefreshman Engineering Program designed to encourage secondary school students to pursue energy-related engineering and science programs during their college careers, and
- o Support 6-8 high school science and math teacher institutes in computer science and energy-related subjects at the DOE national laboratories.

UNIVERSITY RESEARCH INSTRUMENTATION

The continued improvement of energy technologies depends on the development of new knowledge and concepts that can be applied to energy-related materials and processes. The research that leads to this new knowledge requires advanced, state-of-the-art equipment. The types of instruments required for advanced energy research include such equipment as plasma emission spectrometers which will detect and identify materials at the parts per billion level, a variety of scanning microscopes which can be used to obtain greater understanding of surface states and features, and hydrothermal equipment which enables one to simulate the temperatures and pressures which are found deep within the earth and in ocean depths. These and related instruments are very expensive, generally on the order of several hundred thousand dollars, and thus beyond the means of nearly all research universities to finance directly.

In recent years the Department has attempted to help universities obtain access to these and similar sophisticated research instruments by (1) making the equipment at its national laboratories available to university researchers, (2) establishing unique user-oriented research facilities such as the Combustion Research Facility at the Sandia Laboratory at Livermore and (3) providing some funds within research contracts for the less expensive research tools. None of these programs, however, meets the needs of university scientists for continuous availability of the type of equipment which is provided through this program. DOE's University Research Instrumentation program, with an FY 1985 budget request of $6.0 million in Operating Expenses, will focus on those university groups that have demonstrated expertise in one or more of a small number of energy-related topics which are of special concern in the Department's long-range research efforts. Among the research topics likely to be of concern in FY 1985 are combustion, bioconversion related to energy, nuclear waste isolation systems, catalysis, advanced materials science and engineering, and the transport of energy-related pollutants. It is estimated that the $6.0 million requested will enable the Department to assist about 10-20 institutions to obtain the expensive (i.e., over $100,000) specialized instrumentation required.

The program will continue to be coordinated, including both proposal review and awards, with similar programs in the other Federal agencies such as DOD and NSF. The close coordination ensures that each agency's program complements and reinforces the research efforts of all the agencies and makes each program more cost effective.

MULTIPROGRAM GENERAL PURPOSE FACILITIES

The FY 1985 Construction request for the Multiprogram General Purpose Facilities (MGPF) program is $39.0 million (Table 17). The goal of this program, which is managed for the Department by the Office of Energy Research, is to rehabilitate and replace multiprogram general support facilities that are essential to continued operations of the Department's multiprogram laboratory sites. These support facilities include site utilities and support buildings such as laboratories, office buildings and warehouses, roads and railroads, which represent a multibillion dollar government investment.

Table 17
Multiprogram General Purpose Facilities
Budget Authority
($ in millions)
FY 1985 Proposed Projects

	FY 1985 Request
Construction	
Central Chilled Water Facility, BNL (85-R-701)	$ 3.5
Replace Laboratory Roofs, ANL (85-R-702)	3.5
Electrical Distribution System Restoration, ORNL (85-R-703)	1.1
Rehabilitate Underground Steam System, ANL (85-R-704)	3.0
Medical Facility Replacement, LLNL (85-R-706)	1.6
Replace Site Fire Alarm System, RL (85-R-707)	1.3
Establish a Central Chilled Water Plant, ANL (85-R-709)	1.0
Upgrade Environmental Monitoring, ORNL (85-R-711)	1.0
Modify Central Chilled Water Plant, ORNL (85-R-712)	1.0
Prior Year ongoing projects*	22.0
Total	$39.0**

*See Table 18 for additional detail on prior year ongoing projects.
**FY 1984 estimate for MGPF program is $42.1 million.

Table 18
Multiprogram General Purpose Facilities
Budget Authority
($ in millions)

	FY 1985 Request
Construction (ongoing projects)	
Security Facility, ANL (82-E-302)	$1.1
Rehabilitate Power Systems, INEL, LLNL, RL,ORNL (83-E-308)	2.8
Electronics Facility. ANL (83-E-309)	3.2
Utility Replacement & Upgrade, BNL (83-E-310)	3.2
Rehabilitate Old Town Utilities, LBL (84-ER-101)	3.8
Cooling Water Facility Rest., ORNL (84-ER-102)	3.4
Road Repair, LBL, INEL, RL, ANL (84-ER-103)	4.5
Subtotal Ongoing	$22.0

Through continued use and aging, support facilities deteriorate to a point where they are no longer capable of performing their intended functions and must be rehabilitated or replaced. The MGPF program systematically reduces the backlog of deficiencies of these support facilities. It reflects an appropriate Federal responsibility for management of the Government's real property, and we plan to continue the program as a necessary cost of doing business as long as the multiprogram laboratory facilities are used to perform research and development functions for the Department.

The FY 1985 budget request would continue construction on several projects begun in prior years, including rehabilitation of the Old Town area utilities at LBL, the upgrade of the cooling water facility at ORNL and improvements of roads at various laboratories. New projects proposed for FY 1985 would include rehabilitation or replacement of such facilities as an electrical distribution system (ORNL), an underground steam system (ANL), laboratory roofs (ANL), chilled water facilities (BNL, ORNL, ANL), medical facilities (LLNL), a fire alarm system (RL), and an environmental monitoring system (ORNL).

ADVISORY AND OVERSIGHT PROGRAM DIRECTION AND POLICY AND MANAGEMENT

The FY 1985 budget request for Advisory and Oversight Program Direction is $2.9 million. These funds are required to provide for the salaries, benefits, travel and other expenses associated with

44 full-time equivalents. This FY 1985 request will provide the staffing resources required by the Director of Energy Research to carry out his responsibilities under legislation (P.L. 95-91) and those mandated by the Secretary in areas beyond the scope of other ongoing Energy Research programs.

The FY 1985 budget request for Policy and Management is $0.5 million. These funds are required to provide for the salaries and related expenses associated with 8 full-time equivalents in the Office of the Director of Energy Research.

Mr. Chairman, this concludes by testimony. I would be pleased to answer any questions at this time.

QUESTIONS SUBMITTED BY SENATOR WARNER

Nuclear Physics

Question: Can you describe to the committee in layman's terms the purpose of the Continuous Electron Beam Accelerator Facility (CEBAF) and why the Administration believes it is worthy of Federal support?

Answer: Recent advanced high energy and nuclear physics experiments and theory have established that the protons and neutrons which make up atomic nuclei are themselves composed of other smaller particles. Other experiments have demonstrated that the detailed substructure of the proton and neutron is different when they are within a nucleus than when they are in free space. A theory, quantum chromodynamics (QCD) has been developed which is believed to be a fundamental theory of nuclear phenomena.

The Administration gives high priority to supporting such forefront basic research activities as nuclear physics at a level which maintains their vitality and world-competitiveness. Federal support of basic nuclear research is this Nation's long term investment in its technological future with nuclear processes--trained manpower, knowledge base, and advanced instrumentation. The research community has determined that the highest priority for new accelerator construction in the United States nuclear physics program is for an electron accelerator with the properties proposed for the Continuous Electron Beam Accelerator Facility.

These developments provide an exciting opportunity to extend nuclear physics research to a new more fundamental level, and raise many interesting questions. The Continuous Electron Beam Accelerator Facility (CEBAF), with its continuous beam and its capability of providing electron probes at any energy in the range from 500 MeV to 4,000 MeV, offers the opportunity to study these questions with an unprecedented degree of precision.

Question: Concern has been expressed by the scientific community that some nuclear physics projects have not been exposed to intensive peer review prior to Congressional consideration. What is the opinion of the nuclear science community about the CEBAF project? Has it been subjected to peer review?

Answer: The nuclear science community has extensively reviewed the scientific opportunities and has concluded that a high energy, continuous beam electron accelerator facility such as the Continuous Electron Beam Accelerator Facility (CEBAF) is the next logical step for advancement of basic nuclear physics in the United States. This conclusion was developed through a series of studies, reviews, and panels over a five-year period which culminated with the recommendation in the 1979 Long Range Plan for Nuclear Science that a CEBAF-type facility have the highest priority for new construction.

By January 1983, five institutions responded to this identified need and the 1979 Long Range Plan's projection of FY 1985 start of construction by submission of unsolicited proposals; the proposals differed significantly in accelerator concept and other technical parameters. The five institutions were Argonne National Laboratory, University of Illinois at Urbana, Massachusetts Institute of Technology, National Bureau of Standards, and Southeastern Universities Research Association.

The DOE/NSF Nuclear Science Advisory Committee (NSAC) established an ad hoc "Panel on Electron Accelerator Facilities" to recommend the facility or combination of facilities which will best meet the United States needs for basic nuclear research with electromagnetic probes. The Panel, chaired by Professor D. Allan Bromley of Yale University, asked each proposer to provide written critiques of all competing proposals and then respond in public to the written critiques of others. After an intensive series of site visits and public meetings, the Panel reached the following principal recommendation:

> "That the proposal submitted by the Southeastern Universities Research Association (SURA) be accepted and funded for the construction of a new National Electron Accelerator Laboratory (NEAL) centering on a 4 GeV linear accelerator-stretcher ring system capable of delivering intense, high duty factor, electron beams in the energy range from 500 to 4000 MeV."

In April 1983, the parent committee (NSAC) fully endorsed the Panel Report and recommended that it be implemented without delay.

Question: I understand that the Department of Energy/National Science Foundation's Nuclear Science Advisory Committee has prepared a long range plan for nuclear science. Is the CEBAF project included in this long range plan?

Answer: The Continuous Electron Beam Accelerator Facility (CEBAF) and the science to be done with this facility are highlighted in the DOE/NSF Nuclear Science Advisory Committee's (NSAC) "Long Range Plan For Nuclear Science" (December 1983). In the Long Range Plan, NSAC reaffirmed its April 1983 recommendation for the earliest possible start on the construction of CEBAF. The 1983 Long Range Plan specifically calls for start of CEBAF construction in FY 1985.

Question: The Department has sent a $2 million reprogramming request to the Congress which would provide direct support of CEBAF en lieu of more broadly based accelerator research and development activities. Why is this a good idea? How will the money be used?

Answer: The Continuous Electron Beam Accelerator Facility (CEBAF) is the next logical step for advancement of basic nuclear research in the United States. Thus, research and development (R&D) in support of this project is the Nuclear Physics program's highest priority use of FY 1984 accelerator R&D funds.

In order to prepare for a construction project like CEBAF, a substantial amount of R&D effort is needed at an early stage before actual construction begins. Detailed technical design and prototype work on the most difficult components are necessary to refine the conceptual design. These activities include: (1) accelerator design studies on the linac, pulse stretcher ring, and beam switchyard and (2) prototype work on klystrons, modulator, and linac accelerating structures. R&D funds are also critically needed to recruit and develop CEBAF's technical and administrative staff.

Question: Is it customary for the Department of Energy to make Federal research and development funds available for such projects prior to the project receiving Congressional approval through the budget, authorization, or appropriations process? For what specific activities will the funds be used in FY 1984?

Answer: Prior to actually requesting authorization and appropriation of funds for major line item construction projects, the Department of Energy has repeatedly found that complex projects, such as the Continuous Electron Beam Accelerator Facility (CEBAF) project, require substantial research and development (R&D) work to establish technical feasibility and soundness of concept at the detailed level. In order that the Department of Energy have an adequate information base for a decision on a particular project, R&D must be conducted prior to Congressional authorization and appropriation of the line item construction funds. Such R&D provides the needed information but does not constitute a commitment to proceed with construction. We are convinced that R&D prior to Congressional approval is essential to proper formulation of the Department's Budget Request to Congress and to prudent management of the Department's construction projects.

Specific FY 1984 activities in support of CEBAF will include:

1) development of CEBAF's scientific and administrative staff;

2) design and optimization studies on the recirculated linear accelerator and pulse stretcher ring which are the technical heart of the CEBAF accelerator; and

3) prototype of key items of equipment such as the radiofrequency systems which will drive the linear accelerator, the resonant cavities which will accelerate the electron beam, the injection and extraction systems for the pulse stretcher storage ring which will smooth the linear accelerator's pulse into a continuous beam, and the bending and focusing magnets which will transport CEBAF's electron beam through the accelerator complex and into experimental research areas.

Question: Does the expenditure of these FY 1984 funds in the amount of $2 million represent an irreversible commitment to the project? Is there any justification or importance that this work be undertaken even if the CEBAF project does not go forward as planned?

Answer: FY 1984 expenditure of $2.0 million for research and development (R&D) in support of the Continuous Electron Beam Accelerator Facility (CEBAF) project does not represent an irreversible commitment to proceed with construction of CEBAF. The FY 1984 activities will provide a valuable information base for the CEBAF project and will permit urgently needed development of CEBAF's technical and administrative infrastructure. None of the FY 1984 activities will alter the proposed site at Newport News, Virginia or result in installation of permanent equipment.

Significant portions of the R&D work planned for FY 1984 are of interest and importance to a broad community of American scientists working to advance accelerator technology for basic research, biomedical, industrial, and defense applications. Specific examples of such general interest include R&D on high power radiofrequency systems and systems for acceleration and transport of high quality, high intensity electron beams. Thus, the planned CEBAF R&D would be valuable even if the CEBAF project did not go forward.

Question: What is the Administration's FY 1985 budget request for CEBAF and how will this used?

Answer: The FY 1985 Budget Request is $5,000,000 in Operating Expenses to continue and extend research and development (R&D) activities in support of the Continuous Electron Beam Accelerator Facility (CEBAF) construction project and $2,000,000 in Construction funds to initiate the construction project itself. The R&D work will include:

(1) design studies on CEBAF's recirculated electron linear accelerator and pulse stretcher ring;

(2) prototype development of klystrons, modulators, accelerating structures, transmission waveguides, pulse stretcher ring structures, injection and extraction septa for the pulse stretcher ring, and beam switchyard magnets;

(3) optimization studies of experimental buildings and tunnels to house the accelerator complex;

(4) design studies of experimental equipment needed to conduct a research program with CEBAF's unique beams; and

(5) development of CEBAF's technical and administrative team.

Construction activities will include architect/engineering work, detailed design beyond the conceptual level, and preliminary site work including geotechnic studies and renovation of existing buildings to house CEBAF staff.

Questions Submitted by Senator Hatfield

High Energy Physics

Question: In the justification material, the Department has requested a $33.6 million increase over FY 84 "to maintain constant level of program activity". Please provide a breakdown of the figure and describe the need. Is an inflation assumption included in this figure?

Answer: The $33.6 million is the funding required in FY 1985 to maintain the FY 1984 level of effort based on the estimated cost of living index of approximately 6.4 percent calculated specifically for the high energy physics program activities ($31 million). This includes $22.0 million for operating expense, $2.5 million for capital equipment and $6.5 million for construction. It also takes into account anticipated special increases in the Western Area Power Administration electric power rate at the Stanford Linear Accelerator Center ($2.6 million).

Question: Provide a breakdown of the $9.83 million increase over FY 84 levels which was requested to continue facility operation at about 55 percent utilization level. What increase over current levels would be needed to maintain the FY 84 utilization level?

Answer: The $9.83 million increase over the FY 1984 funding level is requested to provide some improvement in facility operation over the FY 1984 level to about the 55 percent utilization level in FY 1985. The breakdown of the increase is: for Fermi National Accelerator Laboratory (Fermilab), $8.0 million; for Brookhaven National Laboratory (BNL), $0.83 million; and for Stanford Linear Accelerator Center (SLAC), $1.0 million. To maintain the FY 1984 utilization level would require $7.5 million dollars primarily at Fermilab. The outstanding example of the new capabilities available in FY 1985 is at Fermilab where the first phase of Tevatron fixed-target operation is coming on in FY 1984. In FY 1985 fixed-target operation at close to 1000 GeV with a substantial increase in the number of experiments taking data is expected. Some increased capabilities will be also available in FY 1985 at BNL and SLAC.

Question: For the record, provide the Committee with a list by laboratory of the proposed increase in capital equipment funding of $65.4 million. Describe the equipment requests for each laboratory and the need for the equipment.

Answer: The FY 1985 request for capital equipment funds is $65.4 million compared to $51.5 million in FY 1984. A major increase in capital equipment funds in FY 1985 is required for the initial complement of detectors and the secondary beams to effectively exploit the new and important research capabilities being made possible by the major new facilities now under construction at the Stanford Linear Accelerator Center (SLAC) and at the Fermi National Accelerator Laboratory (Fermilab). The FY 1985 budget request for a 25 percent increase in capital equipment funding addresses the highest priority needs of this type. In order to have an appropriate initial complement of equipment ready for use when a new research facility becomes operational, several years of lead time are required for design, fabrication, installation, and checkout. For the record a Table is provided which shows, by laboratory, the distribution of the FY 1984 capital equipment funding and the planned distribution of the requested FY 1985 capital equipment funding.

(Dollars in Millions)

	FY 1984	President's Budget FY 1985
Fermi National Accelerator Laboratory	$27.0	$32.1
Brookhaven National Laboratory	3.4	4.3
Stanford Linear Accelerator Center	7.4	10.9
Lawrence Berkeley Laboratory	2.0	1.6
Argonne National Laboratory	0.9	0.6
Other DOE Laboratories	0.4	0.1
Universities	6.9	11.9
Subtotal--High Energy Physics Programmatic	48.0	51.5
BNL--Other Capital Equipment	3.5	3.9
Total	$51.5	$65.4

There are two major construction projects under way at Fermilab (Tevatron I and II) both of which also need an initial complement of equipment. Both new Fermilab capabilities will provide worldwide unique scientific opportunities. Experiments to utilize the 2 TeV antiproton-proton colliding beam capability of the Tevatron I project demand particularly large and complex research detectors. The first detector for the first experimental hall, which is planned to be in operation when Tevatron I comes into operation in 1986, is about one-half completed. The FY 1985 requirement to have this detector completed on schedule is $11 million. Work on the detector for the second experimental hall will be initiated at a level of approximately $1.5 million in FY 1985 so that it can be completed in the FY 1988 time frame. The Tevatron II construction project is well advanced and will be completed by the end of FY 1985. This upgrade of the existing experimental areas and construction of four major new fixed-target research capabilities will serve about a dozen simultaneous experiments. Substantial capital equipment funding is required for each of these experiments, whether involving a new detector or an upgrade of an existing one, and for the components for each of the new secondary beam lines which must be procured with capital equipment funds. These Tevatron II related efforts require $14.5 million in FY 1985. The remaining $5.1 million of the Fermilab request is for additions to the Fermilab computer systems, technical support equipment for the accelerators, standardized small items of electronics and other equipment to support user experiments.

The equipment needs at Brookhaven National Laboratory are primarily related to carrying out approved experiments and to upgrading the capabilities of the secondary beams of the Alternating Gradient Synchrotron (AGS). Key projects being pursued in FY 1985 are a new detector to study rare kaon decays and improvements to the polarized beam capability and beam intensity of the AGS.

The Stanford Linear Collider (SLC) project at SLAC is off to a good start, and if funded at the planned schedule, is expected to become operational around the end of 1986. The existing and proven Mark II detector at SLAC is being upgraded and augmented for first exploratory research use at the SLC. To meet the required schedule, \$4.7 million of capital equipment funds will be needed for this upgrade in FY 1985. In order to more fully utilize the research capabilities provided by the SLC and to maintain a competitive U.S. program, a new detector optimized for research in the SLC energy range will be needed by around 1989; about \$3.3 million in equipment funding is required in FY 1985 to start fabrication on this detector. The remaining \$2.9 of the request for SLAC is primarily for the equipment for Positron Electron Project (PEP) and Stanford Positron-Electron Asymmetric Ring (SPEAR) experiments.

The combination of the equipment needs of these new high energy physics facilities at Fermilab and SLAC, in addition to the ongoing needs for capital equipment in other parts of our program, has generated extreme pressure on our capital equipment budget. The FY 1985 request meets the highest priority needs so that each of these new research facilities now under construction can be exploited in a timely fashion, thereby ensuring that the U.S. high energy physics program will remain productive and competitive with those of other countries and regions.

The equipment needs at Lawrence Berkeley Laboratory (LBL), Argonne National Laboratory (ANL), and other DOE laboratories are related primarily to detectors for experiments these groups are conducting at the DOE accelerator laboratories and for the Soudan II experiment ANL is pursuing in a deep underground mine. At LBL, equipment is also provided in support of the accelerator R&D effort.

The need for equipment by university contractors is primarily for detector apparatus for experiments by U.S. physicists at U.S. and foreign accelerator laboratories and for needs of nonaccelerator experiments. The needs are large in FY 1985 with the many new beam lines provided by Tevatron II, the U.S. commitment to experiments using the unique research capabilities of the European Large Electron Positron (LEP) and Japan facilities and commitment to improve nonaccelerator experiments, such as proton decay. There are also needs for online and batch data processing equipment at the universities. The funds are expected to be allocated to more than twenty universities.

Question: For the construction request, provide a list of projects including the TEC, prior years, FY 83, FY 84, FY 85 levels and future year requirements up to completion.

Answer: The following list tabulates the requested data for high energy physics construction projects included in the FY 1985 budget request.

(Dollars in millions)

	Prior Years	FY 1983	FY 1984	FY 1985	FY 1986	TEC
Tevatron I	$16.1	$18.0	$20.0	$21.3	$ 7.1	$82.5
Tevatron II	6.8	18.0	13.0	12.0	—	49.8
Stanford Linear Collider	—	—	32.0	60.5	19.5	112.0
Accelerator Improvement Project	—	8.0	9.0	10.0	—	—
General Plant Project	—	6.5	7.0	10.2	—	—

Question: Why is $60.5 million needed for the Stanford Linear Collider in FY 1985? How would a $20 million reduction affect the project?

Answer: The Stanford Linear Collider (SLC) was planned on an optimized three-year construction schedule. The $60.5 million requested for SLC is required to maintain the schedule for this important project. The SLC project has gotten off to an excellent start in FY 1984. The $32 million construction funds appropriated by Congress for FY 1984 was made available to the Stanford Linear Accelerator Center (SLAC) on October 3, 1984; within a week, the first major contract was awarded by SLAC. This contract was with Gates and Hodges, a California-based tunneling contractor, for construction of the two arc tunnels that will contain the magnets which guide the electrons and positrons from the end of the existing SLAC linac to the SLC interaction region. Since then, additional large contracts have been let for procurement of magnet steel and for production of magnet laminations. Several major milestones have been completed; among them improvement of the SLAC linac and success of efforts to reduce the electron and positron beam cross sections and acceleration of tightly bunched, high peak current electron beams through the first third of the two-mile long linear accelerator with proper characteristics for SLC operation. The ability to continue the excellent progress on SLC and meet the planned goal of first beam in October 1986 is paced by funding. The FY 1985 funding request is essential to complete procurement of critical technical components and to place under contract the construction of the interaction hall which is on the critical path for completion of this project and where experiments will be located.

A $20 million reduction in the fiscal year request of $60.5 million for SLC construction would delay the project by a full year and would add about $9 million to the cost, depending in part on the final funding profile provided. A primary factor in the increased cost is that the staff supporting the SLC activity would have to be maintained for an additional year both in the R&D and construction phases of the SLC project. The present estimate is that the additional costs to the project would be $6.0 million for incremental staff costs and inefficiency associated with a one-year delay and that the escalation on deferred funding would add an additional $3.0 million to the total estimated cost.

The SLC has been developed with a dual purpose; to take a major step forward in accelerator technology which is essential to future progress in the capability of electron-positron colliders and to provide a copious source of the newly discovered Z^0 particle for the purpose of studying the electroweak interaction. The SLC will give U.S. physicists a first and unique opportunity in the world to carry out precision research in this scientifically exciting and important area of physics.

Question: Provide a list of the proposed GPP projects at each laboratory including the TEC of each. Also, please provide a breakdown for FY 83 and FY 84.

Answer: The requested information for GPP projects is shown in a table I would like to insert in the record.

GENERAL PLANT PROJECTS

Summary of General Plant Projects
(In Thousands of Dollars)

	FY 1983	FY 1984	FY 1985
Brookhaven National Laboratory........	$ 3,000	$ 3,200	$ 5,700
Fermi National Accelerator Laboratory.	2,460	2,500	3,000
Stanford Linear Accelerator Center....	1,040	1,300	1,500
Total General Plant Projects.........	$ 6,500	$ 7,000	$10,200

FY 1985 GPP Subprojects by Laboratory
(In Thousands of Dollars)

	TEC	FY 1985
Brookhaven National Laboratory:		
Neutrino Oscillation Experimental Facility..................................	$ 400	$ 400
AGS cooling tower improvements..............	300	300
Additional building space for Biology........	300	300
Central computer facility building modifications............................	350	350
Building addition for NSLS.................	300	300
Power improvements to AGS experimental areas	400	400
Facility for coal-water slurry technology...	300	300
Expansion of Test Beam Facility at the AGS..	250	250
Accumulator ring equipment housing..........	550	550
Upgrade cooling tower system................	350	350
Neutrino power supply control housing.......	150	150
Nuclear Energy Program building expansion...	150	150
Construct alternate power source for LINAC..	300	300
Additional space for Structural Biology Research.................................	250	250
AGS radiation storage facility..............	300	300
Target room addition to NSLS facility.......	350	350
Addition to Physics building................	250	250
Miscellaneous small projects................	450	450
Subtotal................................	$ 5,700	$ 5,700
Fermi National Accelerator Laboratory:		
Parts storage facility......................	$ 200	$ 200
Improvements to utility corridor around main ring................................	500	500
Upgrade of power supply switchgear..........	700	700
Upgrade of refrigeration power and cooling systems.................................	500	500
Additional office and light laboratory space	200	200
Experimental area power distribution improvements............................	200	200
Repair to existing buildings in Village area	250	250
Flammable liquid and gas storage facility...	150	150
Upgrade of industrial and receiving facilities...............................	300	300
Subtotal	$ 3,000	$ 3,000

Stanford Linear Accelerator Center:	TEC	FY 1985
Addition to central laboratory annex........	$ 700	$ 700
Utility upgrade to increase capacity of PEP system.....................................	700	700
Miscellaneous small projects................	100	100
Subtotal	$ 1,500	$ 1,500
TOTAL FY 1985 GENERAL PLANT PROJECTS........	$10,200	$10,200

FY 1984 GPP Subprojects by Laboratory
(In Thousands of Dollars)

Brookhaven National Laboratory:	TEC	FY 1984
Addition to LINAC power substation...........	$ 200	$ 200
High energy equipment pool building addition.	500	500
Storage building for specialized components..	200	200
Assembly building utility improvements.......	350	350
Culture transfer facilities for genetic research....................................	200	200
Medical research center utility improvements.	200	200
High Flux Beam Reactor cooling system improvements................................	250	250
Low Level Waste laboratory addition..........	350	350
Building addition to heavy machine shop......	300	300
Safety improvements to Medical Research Center......................................	150	150
Conversion of lecture hall to training facility....................................	150	150
Miscellaneous small projects.................	350	350
Subtotal...................................	$ 3,200	$ 3,200

Fermi National Accelerator Laboratory:	TEC	FY 1984
Addition to Central Helium Liquifier building....................................	$ 300	$ 300
Improvement to primary power distribution system......................................	250	250
Additional main ring service and support buildings...................................	250	250
Main ring access road and service building upgrade....................................	200	200
Critical equipment storage facility..........	150	150
Additional beam switchyard service building..	200	200
Research services technical assembly building	650	650
Utility extension for experimental areas.....	300	300
Site and drainage improvements in experimental areas...........................	200	200
Subtotal...................................	$ 2,500	$ 2,500

Stanford Linear Accelerator Center:	TEC	FY 1984
Modifications to PEP support buildings.......	$ 280	$ 280
Cooling tower installation..................	320	320
Expansion of master control center...........	700	700
Subtotal...................................	$ 1,300	$ 1,300
TOTAL FY 1984 GENERAL PLANT PROJECTS.........	$ 7,000	$ 7,000

FY 1983 GPP Subprojects By Laboratory
(In Thousands of Dollars)

	TEC	FY 1983
Brookhaven National Laboratory:		
Integrated Test Bed Facility.................	$ 155	$ 155
Experimental Equipment Enclosure.............	400	400
Catalytic Development Laboratory.............	150	150
Additional Building Services, AGS............	150	150
Crane Modifications..........................	125	125
Building additions and modifications.........	142	142
Cooling Tower Improvements...................	225	225
Power room addition, NSLS....................	185	185
Exhaust system improvement...................	110	110
Ring road extension for AGS..................	131	131
Modular building addition, NSLS..............	220	220
Energy fire protection and generator systems.	167	167
Computer facility modifications..............	163	163
Repair and maintenance projects under $50,000	677	677
Subtotal...................................	$ 3,000	$ 3,000
Fermi National Accelerator Laboratory:		
East Booster Gallery Addition................	$ 300	$ 300
Central Helium Liquifier Building Expansion..	400	400
Transfer Gallery Addition....................	994	994
Magnet Storage Building......................	331	331
Chilled water systems upgrade................	60	60
Upgrade Village Gas Service..................	53	53
Service Building Extension and Utilities.....	322	322
Subtotal...................................	$ 2,460	$ 2,460
Stanford Linear Accelerator Center:		
Chemical Storage Ring........................	$ 45	$ 45
Electronic Building Annex....................	995	995
Subtotal...................................	$ 1,040	$ 1,040
TOTAL FY 1983 GENERAL PLANT PROJECTS.........	$ 6,500	$ 6,500

Question: Why is it critical to provide $10 million in FY 85 for the Accelerator Improvement Projects? How will it be used? What was included for this effort in FY 83 and FY 84?

Answer: A total of $10 million is requested for Accelerator Improvement Projects (AIP), to be distributed as follows: Fermilab ($5.3 million); Brookhaven National Laboratory ($2.0 million); and Stanford Linear Accelerator Center ($2.7 million). AIP funds are essential on an annual basis to provide modifications and upgrades of existing accelerator and colliding beam facilities in order to maintain their scientific effectiveness and to improve their operating efficiency and economy.

There are special needs for AIP funds at Fermilab because of the very large scale and scope of the superconducting energy saver/Tevatron accelerator and its extended cryogenics facilities, experimental facilities and beam lines. These requirements are particularly important at this time because of the need to adjust to the new 1000 GeV capabilities being brought into final operation for research. Of the $5.3 million requested for Fermilab, $3.2 million is for improvements to the accelerator and $2.1 million is for improvements to experimental facilities.

At the Brookhaven National Laboratory, funds are requested for modifications, improvements and additions to the Alternating Gradient Synchrotron (AGS) and its related experimental facilities. Of the $2.0 million requested, $1.4 million is planned for improvements to the polarized beam capability of the AGS and $0.6 million for other AGS improvements. At SLAC AIP needs are related to the SLAC linear accelerator, and the SLAC Positron Electron Asymmetric Ring (SPEAR) and Positron Electron Joint Project (PEP) colliding beam facilities at the Stanford Linear Accelerator Center. Of the $2.7 million requested, $2.2 million is for upgrading of 10 sectors of the linac to handle very intense pulses of 50 GeV beam and $0.5 million is requested for a number of activities related to PEP.

Funding for Accelerator Improvement Projects consisted of $8.0 million in Fiscal Year 1983, and $9.0 million in Fiscal Year 1984.

Superconducting Super Collider

Question: What is the total request in FY 85 for the Superconducting Collider?

Answer: We are requesting $20 million for R&D related to the Superconducting Super Collider (SSC) in FY 1985. This compares with the $19.5 million in the FY 1984 budget.

Question: How will this funding be utilized?

Answer: The $20 million requested in FY 1985 will be used to continue cost-reduction studies, evaluation of cost and design tradeoffs, and evaluation of alternate superconducting magnet concepts; to validate the assumptions of the reference designs; to initiate conceptual design studies for a cost/performance optimized accelerator facility; and to initiate evaluation of site requirements. The funding plan as presently envisioned includes $15.5 million for superconducting magnet R&D, $1 million for R&D on other technical systems, $2 million for design studies and accelerator physics, and $1.5 million for management and integration of the national SSC effort.

Question: How much is allocated for the SSC in FY 84? Describe your activities. Specifically, how much is allocated for the R&D program at each location?

Answer: We have allocated $19.5 million for SSC-related activities in FY 1984. The FY 1984 SSC activities include the reference designs study which will provide a good preliminary cost estimate based on clearly stated, credible assumptions about possible R&D accomplishments; R&D on alternate superconducting magnet concepts; R&D on other technical systems; accelerator physics studies; and management and administration to achieve effective integration and coordination of the national SSC effort. The funds are divided as follows: BNL, $11.1 million, including $0.5 million for services by an architect-engineering firm in support of the reference designs study; Fermilab, $4.0 million; LBL, $2.0 million; Texas Consortium [Houston Area Research Council, Texas A&M University, Rice University, University of Houston, University of Texas (Austin), University of Wisconsin, as well as participants from four DOE laboratories], $1.6 million; and $0.8 million to be allocated late in the year.

Question: Describe fully any activities in FY 84 and FY 85 being undertaken by DOE or contractors with respect to site work of any kind.

Answer: There are no site-related activities in FY 1984. In FY 1985, as we begin to develop a conceptual design for the SSC, there will be consideration of site requirements for the facility. This effort will lead to a site criteria document to be available in early FY 1986 which will be a factor in a competitive site selection process.

Question: Explain your design activities in FY 84 and FY 85.

Answer: The FY 1984 activities are focused primarily on the reference designs study and preliminary R&D on several superconducting magnet concepts. In FY 1985 the magnet R&D will continue with a focus on narrowing down magnet options and on developing an optimized cost-saving design and validating the technical and cost assumptions of the reference designs study. In addition, work will begin to focus on system designs, cost optimization and tradeoff studies with the goal of providing a final conceptual design and a firm cost estimate by mid-FY 1986.

Nuclear Physics

Question: What is the operating budget for the seven existing accelerator facilities in FY 83, FY 84, and FY 85?

Answer: I will be pleased to provide this information for the record. Table follows:

Nuclear Physics National Facilities
Facility Operations
(B/A in Millions of Dollars)

	FY 1983	FY 1984	FY 1985
Argonne Tandem/Linac Facility	$ 1.6	$ 2.1	$ 2.2
Brookhaven Double MP Tandem Facility	1.3	1.5	1.6
Lawrence Berkeley SuperHILAC/Bevalac	14.5	17.3	17.6
Lawrence Berkeley 88-Inch Cyclotron	1.8	2.0	2.1
Los Alamos Clinton P. Anderson Meson Physics Facility (LAMPF)	32.3[1/]	33.5[1/]	36.5
MIT Bates Linear Accelerator Center	4.7	5.4	5.7
Oak Ridge Holifield Heavy Ion Research Facility	4.5	4.8	5.0
	$60.7	$66.6	$70.7

[1/] Includes Defense Programs support of LAMPF operations: $3.0 million in FY 1983 and $3.0 million in FY 1984.

At each of the national facilities, beam time for nonproprietary work is available to all the Nation's scientists on the basis of scientific merit and technical feasibility of proposals reviewed by peer committees called program advisory committees. The program advisory committee for a given facility reports to the director of that facility. On the average, the national facilities provide 40 to 60% of their total beam time for research to outside, university-based user scientists.

Facility Operations includes costs of delivering beam for use by research scientists. It includes all costs of accelerator operations (including electric power) and maintenance and includes all costs of operation and maintenance of permanently installed equipment such as beam lines, beam dumps, and magnetic spectrometers. Facility Operations does not include cost of setup and execution of individual experiments, support of in-house research, support of outside user research, or cost of Plant and Capital additions to the accelerator laboratory.

To complement the seven national accelerator facilities, the Nuclear Physics program supports dedicated on-campus accelerators at Yale University, Duke University, the University of Washington, and Texas A&M University. While each of these on-campus facilities has an important visitor program, they are operated principally for the research use of the host university's faculty, postdocs, and graduate students. These four facilities have a combined Facility Operations budget of $2.6 million in FY 1983, $3.0 million in FY 1984, and $3.1 million in FY 1985.

Question: What is the level of utilization for each of the accelerator facilities in FY 84 and FY 85? What is the overall utilization level?

Answer: I will be pleased to provide this information for the record. Table follows:

National Facilities
Utilization
(Beam Hours for Research)

	FY 1984	FY 1985
Argonne Tandem/Linac Facility	4,400	3,050
Brookhaven Double MP Tandem Facility	4,000	2,500
Lawrence Berkeley SuperHILAC/Bevalac	3,900	3,600
Lawrence Berkeley 88-Inch Cyclotron	3,500	3,500
Los Alamos Clinton P. Anderson Meson Physics Facility (LAMPF)	3,100	2,450
MIT Bates Linear Accelerator Center	2,460	2,400
Oak Ridge Holifield Heavy Ion Research Facility	3,350	4,000
Total	24,710	21,500

Based upon our experience with these facilities, we estimate full or 100% utilization of all seven facilities would yield a total of 40,000 beam hours for research. Thus, the overall utilization level will be 62% in FY 1984 and 54% in FY 1985.

Each of the dedicated on-campus facilities at Yale University, Duke University, University of Washington, and Texas A&M University operates 6,000 to 7,000 hours per year for research. We expect approximately a five percent overall reduction in research hours in FY 1985 with respect to FY 1984.

Question: Why is $13.7 million necessary for capital equipment in FY 85?

Answer: As basic nuclear research advances into new scientific areas, there is a continuing need to develop new detection instrumentation, upgrade the capabilities of existing instruments, improve the efficiency and sophistication of data acquisition and analysis systems, and improve the performance and beam characteristics at the Nuclear Physics accelerator facilities. Of the $2.4 million increase in Capital Equipment in FY 1985 over FY 1984, $1.7 million is required for the Tandem/AGS Heavy Ion Transfer Line initiative. These funds are needed for instrumentation capable of detection, identification, and analysis of the fragments which are produced in the collision of nuclei at the uniquely high energies to be available at the Alternating Gradient Synchrotron upon completion of the Transfer Line construction project. The remaining $0.7 million increase, or six percent over the FY 1984 base of $11.3 million, permits instrumentation within the Nuclear Physics program to continue at FY 1984 levels of activity.

Question: For the record, provide a list of construction projects including the TEC, FY 84 and FY 85 levels, and future year requirements up to the completion date.

Answer: I will be pleased to provide this information for the record. Table follows:

Nuclear Physics
Construction Projects
(Dollars in Millions)

	FY 1984	FY 1985	FY 1986 and Beyond	TEC
University Accelerator Upgrade Project at the University of Washington and Yale University	$ 8.0	$11.0	$ 0	$19.0
Continuous Electron Beam Accelerator Facility	0	2.0	under review	under review
Tandem/AGS Heavy Ion Transfer Line	5.0[1/]	5.3	0	10.3

1/ Proposed reprogramming from ISABELLE construction project (78-10-b).

In addition, we have an annual requirement for minor upgrades and modifications budgeted under Accelerator Improvements and Modifications (AIM) and General Plant Projects (GPP). Each year's AIM and GPP projects are complete and self-contained. That is, each year's request is sufficient to complete all subprojects identified for that year.

Nuclear Physics
AIM and GPP
(Dollars in Millions)

	FY 1984	FY 1985
AIM	$ 3.5	$ 3.5
GPP	2.2	3.5

Question: How will the $3.5 million for 85-R-200 be utilized in FY 85?

Answer: We plan to use the $3,500,000 requested in FY 1985 for Accelerator Improvements and Modifications (85-R-200) for four subprojects:

(1) At Argonne National Laboratory, an accelerator test bed for the superconducting linac will be constructed. The test bed will allow the implementation of a maintenance system that will increase both the running time and accelerating voltage of the Tandem/Linac Facility by at least 15%. Total Estimated Cost (TEC) is $660,000.

(2) At Lawrence Berkeley Laboratory, an upgrade of the beam lines at the Bevalac is planned. This upgrade will increase the transmission efficiency for Bevalac beams, improve the ease and speed of switching beam lines, and

provide the capability of delivering beams of rare isotopes for use by researchers. TEC is $1,400,000.

(3) At Los Alamos National Laboratory, we will install advanced beam current control and monitoring instruments at the main LAMPF beam stop and replace 60 of the 104 quadrupole focusing magnets in the proton linac with improved magnets. These improvements will correct operational problems and reduce down time as well as provide new capability for research programs. TEC is $1,100,000.

(4) At the Massachusetts Institute of Technology, modification of the radiofrequency power system at the Bates Linear Accelerator Center is planned to increase the peak power capability. This change will increase reliability for running in the 600 to 840 million electron volt energy range and provide the option of increasing the maximum energy to approximately 1,000 million electron volts. TEC is $340,000.

Question: Explain the need for $3.5 million in FY 85 allocated for GPP projects. How does this compare to FY 84?

Answer: Of the $3,500,000 requested in FY 1985 for GPP projects, $2,500,000 is needed at the Lawrence Berkeley Laboratory. The Nuclear Physics program has the responsibility of providing for the general plant needs of the entire laboratory. These needs include an ultra high vacuum processing facility, a storage yard for plant engineering and construction equipment, a PCB and radioactive materials storage area, and various building rehabilitation and small upgrade projects. At the Los Alamos National Laboratory, a $950,000 service building to house personnel associated with LAMPF day-to-day experimental area operations is needed to move people out of the present antiquated and inefficient house trailers now used for office space. At the MIT Bates Linear Accelerator Center, $50,000 is needed for minor building and roadway improvement projects.

In FY 1984, a total of $2,500,000 was appropriated and distributed as follows: $1,500,000 at Lawrence Berkeley Laboratory, $500,000 at Los Alamos National Laboratory for LAMPF plant projects, and $200,000 at Massachusetts Institute of Technology Bates Linear Accelerator Center. The main difference between FY 1984 and FY 1985 is that the request for Lawrence Berkeley Laboratory is $1,000,000 higher in FY 1985. This increase is necessary to maintain efficiency and safety standards at the physically oldest of the national laboratories.

CEBAF

Question: Explain your plans for the $2 million which is requested in FY 84? Provide a breakdown of the request and the need to proceed in FY 84 with each element of the request.

Answer: Our $2,000,000 reprogramming would provide for FY 1984 research and development (R&D) activities in support of the Continuous Electron Beam Accelerator Facility (CEBAF) project. These R&D activities include: (1) development of CEBAF's scientific and administrative infrastructure; (2) detailed design and optimization studies on the recirculated linear accelerator and pulse stretcher ring which are the technical heart of the CEBAF accelerator; and (3) prototype of key items of equipment such as the radiofrequency systems which will drive the linear accelerator, the resonant cavities which will accelerate the electron beam, the injection and extraction systems for the pulse stretcher storage ring which will smooth the linear accelerator's pulse into a continuous beam, and the bending and focusing magnets which will transport CEBAF's electron beam through the accelerator complex and into experimental research areas. While the technical feasibility of the CEBAF linear accelerator/pulse stretcher ring concept is established, R&D activities are essential to convert technical feasibility into detailed design. This is true of all major accelerator projects.

Of the $2,000,000, $915,000 is budgeted for development of CEBAF's scientific and administrative infrastructure. The key activity is recruitment and support of people who, in the near term, will carry out those detailed design and optimization studies necessary for a reliable project schedule and cost estimate and who, in the longer term, will be the nucleus of the team responsible for construction of CEBAF. The most urgent needs are for a permanent facility director and deputy director, an associate director of CEBAF's Technical Division, an associate director of CEBAF's Administrative Services Division, a project engineer, two engineers experienced in high power radiofrequency systems, four accelerator physicists, plus administrative personnel to support the scientists and engineers. Development of CEBAF's infrastructure also includes establishment of an integrated accounting system, lease of two minicomputers for design studies and administrative use, and acquisition of small items of test equipment.

The detailed design and optimization studies are necessary to establish a reliable project schedule and cost estimate for CEBAF and to establish criteria for construction and R&D activities in FY 1985. In addition to personnel costs cited above, $235,000 is needed in FY 1984 for advanced engineering studies and consultant services by non-CEBAF staff.

The most pressing need for prototype development is in the area of the high power systems which convert ordinary AC line power to the radiofrequency power required to drive an electron linear accelerator; $700,000 is budgeted for this purpose. Outcome of this prototype work will determine major cost and performance components of the CEBAF linear accelerator. An additional $150,000 is planned for prototype of beam transport and experimental area systems.

Question: How much is requested in FY 85 for the Continuous Electron Beam Accelerator Facility (CEBAF) project?

Answer: The FY 1985 Budget Request is $5,000,000 in Operating Expenses to continue and extend research and development (R&D) activities and $2,000,000 in Construction funds to initiate the construction project itself.

Question: Why is it necessary to proceed with construction activity in FY 85? What is the proposed schedule?

Answer: To avoid delay of the overall project, some site-specific work must be done in FY 1985. This work includes: modification and rehabilitation of parts of the existing, Government-owned Space Radiation Effects Laboratory building to house Continuous Electron Beam Accelerator Facility (CEBAF) staff and research and development activities; architect/engineering work; detailed design beyond the conceptual level; detailed examination of geologic structures; and minor site modification such as possible relocation of utilities and roads. Construction funds are needed for these activities.

To some considerable extent, our FY 1985 construction schedule will be determined by the availability of the $2,000,000 of FY 1984 reprogrammed funds. Orderly buildup of CEBAF's technical and administrative staff and other infrastructure is essential to conduct of FY 1985 construction work. Our FY 1985 construction objective is completion of architect/engineering work, detailed design work, and minor site work to the point that bid packages for critical path items of conventional construction and long lead-time accelerator components can be released as soon as FY 1986 construction funds are available. We believe that this objective can be met with the $2,000,000 in FY 1984 reprogrammed funds.

Question: What is the total cost of the project anticipated to be at this time? What is the basis for this cost estimate?

Answer: Exact construction costs and project schedule are presently under review. At this time, we estimate that construction costs for the Continuous Electron Beam Accelerator Facility (CEBAF) will not exceed $225 million. This estimate is based upon our review of a draft Conceptual Design Report submitted to us by Southeastern Universities Research Association and a formal review of the CEBAF construction project. This review was conducted on February 27 and 28, 1984 by Department of Energy Headquarters and Oak Ridge Operations Office staff.

Question: What would be your estimate of the annual operating expenses for the project? What would be the total number of years of operation?

Answer: Upon completion, we expect the Continuous Electron Beam Accelerator Facility (CEBAF) to require an annual operating budget of approximately $15 million in FY 1984 dollars for facility operations. Facility operations includes all costs of operation and maintenance of the accelerator complex, permanently installed equipment, and the physical plant--that is, all costs of delivering beam for use by research scientists. In addition, an annual budget of about $5 million will be required for research by CEBAF staff and for plant and instrumentation improvements.

Because accelerator facilities are continuously upgraded to meet evolving scientific challenges, their useful life is basically determined by their ability to respond to these evolving challenges. The technical design concept for CEBAF's accelerator and experimental facilities is sound and flexible. In its examination of competing accelerator designs, the DOE/NSF Nuclear Science Advisory Committee specifically cited this capability for future expansion as an asset of the CEBAF proposal. Thus, we expect CEBAF to have a long and productive life. Based upon our experience with basic nuclear research facilities, we expect CEBAF to have a useful life of at least 20 to 25 years.

Question: Explain your statement on page 22, that $2 million in construction funding is to be used . . . . "in order to establish a reliable cost estimate for the CEBAF project."

Answer: Construction activities in FY 1985 will include architect/engineering work on the buildings to house the Continuous Electron Beam Accelerator Facility (CEBAF) accelerator complex and experimental areas, detailed design work beyond the conceptual level on key accelerator components such as accelerating structures and radiofrequency power systems, and detailed examination of site geology. Thus, these construction activities will refine our knowledge of major cost components of the CEBAF project and enable us to establish a more reliable cost estimate for the CEBAF project.

Question: Provide a breakdown of the $2 million construction request, including the amount for site work and a description of this work.

Answer: The $2,000,000 in Construction funds will be used as follows:

Engineering and Design of the Accelerator Technical Components	$1,100,000

Detailed design of long-lead time accelerator components will be performed to the point that a set of drawings exist that can be used in competitive bid packages. This requires that alternative designs be developed in enough detail so that the best one is selected. Equipment used at other accelerator laboratories will be compared to make sure the best technical principles and design techniques are utilized.

For the linear accelerator (linac), a careful study of all aspects of the accelerator structure is very critical. The radiofrequency cavity structure will be studied from many aspects, energy gain, heat dissipation, transient beam loading, beam break-up modes, dimensional stability, ease of manufacture, quality assurance, and life time. Detailed design of the cavity structure for the linac will be done. The klystron radiofrequency power tubes and pulse switching devices will be selected and optimized for high power use in the CEBAF environment.

The optics of the beam recirculator will be examined to select the best overall geometry, number, and size of bending magnets and choice of focusing elements. Shop drawings will be prepared.

The layout of the beam switchyard will be determined. This requires studies of various alternatives, including the design and engineering of the magnets which will rapidly switch the beam to the three target areas on a pulse to pulse basis.

The Pulse Stretcher Ring will be engineered for the high power beams it must carry. Careful study is needed to select the right choice for radiofrequency cavities in the stretcher ring.

The control systems for the accelerator will receive detailed attention. The high power of the beam requires instantaneous response to corrective signals in order to prevent damage to components. A sophisticated computer control system will be designed to monitor every function in the accelerator and to enable switching of the beam among the three target areas at a rate of 1,000 pulses per second.

Architectural/Engineering Work on Conventional Construction	$ 750,000

The design of the accelerator tunnels is the first priority. Various alternative approaches will be investigated to find the most satisfactory solution. The need for thick radiation shielding is of paramount importance. The choice of tunnel depth depends on many factors: the availability of fill, ground water, long term stability for the purpose of preserving accelerator alignment, and cost. Optimum tunnel depth will be determined. Ventilation procedures will be determined for control the activated air which will be generated near accelerator components.

The design for the experimental area will be developed to provide the maximum flexibility for the future experimental program. The above-surface structures for the radiofrequency power equipment, magnet control devices, cooling systems, and power substations will be designed.

Support structures to house the accelerator control activities, preparation of experiments, and offices for the operations staff will be designed.

Initial rehabilitation of the Space Radiation Effects Laboratory building	$ 100,000

In order to have space available to test the prototype high powered klystrons and modulators for the radiofrequency power system of the linac, some rehabilitation of the SREL building will be done. Set-up space will be established for prototype bending and switching magnets.

Geotechnical Investigations	$ 50,000

Subsurface investigations in the location of the accelerator tunnels, rings, and the buildings which house the experimental research activities will be conducted in order to design their footings.

Question: Will the participating states or localities be contributing anything to the project?

Answer: Member institutions of the Southeastern Universities Research Association (SURA) have already contributed approximately $1.5 million to the project in the form of faculty salaries and direct contributions. The City of Newport News will contribute real estate for the project which has a value of approximately $5-10 million. The Commonwealth of Virginia is providing at no charge to the Federal Government the 35,000 square-foot Virginia Associated Research Campus building, 68 acres of land, and a staff of 17.5 state-supported positions, worth $400,000 to $500,000 annually for the life of the project. Recently, the Commonwealth of Virginia appropriated $1 million per year for the next two years for faculty salaries in support of the CEBAF project. In addition, SURA institutions are creating 30 new faculty positions in experimental and theoretical nuclear physics. In summary, the total amount of non-Federal support for this project is rather substantial.

Question: When will the State of Virginia's funding be available and what will be the planned use of the funds?

Answer: The State of Virginia is presently providing direct support for the project; $160,000 was made available on July 1, 1983. Further funding from the State of Virginia will start July 1, 1984 at a level of $1 million annually. The funds will be used to support five Governor's Distinguished Professorships and four tenured professorships for the life of the project. In addition, 11 junior faculty positions will be supported for a two-year period.

Question: What efforts have or will be made to include industry and other universities in the plans and operation of the project?

Answer: The Continuous Electron Beam Accelerator Facility (CEBAF) will be operated as a national facility. Beam time for nonproprietary work will be available to all the Nation's scientists on the basis of scientific merit and technical feasibility of proposals. In addition, the Southeastern Universities Research Association (SURA) has created an Industrial Affiliates organization which is open to industry and nonprofit organizations other than universities. The purpose of Industrial Affiliates is to provide a forum for close communication between industry and the CEBAF project. Scientists from non-SURA universities belong to the CEBAF Users Group and the SURA National Advisory Board.

Basic Energy Sciences

Question: How is the operating expenses increase of 18% over FY 84 spread over each of the 10 BES facilities listed in Table 6. Provide a breakdown with FY 84 and FY 85 levels.

Answer: The operating expenses increase of 18% is for the overall BES program. The increase for the 10 BES facilities listed in Table 6 is 21% while the increase for nonfacility related activities e.g. research on materials, heavy ion fusion, applied mathematics research, etc. is 16%. The operating expenses associated with each of the 10 facilities identified are presented in the table below. Operating expenses include the costs for operating the facilities, for support of research at them, fuel for nuclear reactors and costs of providing services to outside users.

Table

(dollars in millions)

B/A

	FY 84	FY 85 Pres. Budget	% Incr FY 85 Over FY 84
High Flux Beam Reactor	$10.4	$12.5	20
National Synchrotron Light Source	16.1	19.1	19
Intense Pulsed Neutron Source	7.0	7.5	7
High Voltage Electron Microscope-Tandem Facility	1.2	1.4	17
Oak Ridge Electron Linear Accelerator	3.2	3.5	9
High Flux Isotope Reactor	8.3	10.2	23
High Flux Isotope Reactor-Fuel Inventory	0	1.5	
Combustion Research Facility	5.5	6.0	9
National Center for Electron Microscopy	1.8	2.2	22
Stanford Synchrotron Radiation Laboratory	6.8	8.0	18
Stanford Synchrotron Radiation Laboratory-Part of CAM Initiative	.7	1.7	
Spallation Neutron Research Facility	1.6	2.3	44
	$62.6	$75.9	21

Question: You indicate on page 31 that increases are provided "to operate the new state-of-the-art facilities." How much is provided and at what facilities?

Answer: Increases provided to operate the new facilities are listed in the table below. The information includes only that portion of operating costs that are required to "operate" the facility. Costs for research at the facility are not included. The total operating expenses for the facilities, including both operation of the facility and research at it, are included in the answer to the preceding question. The increases requested are needed for the effective operation of these facilities to assure their availability to meet the wide demand for experimental time by the user community.

Table

(dollars in millions)

Facility	FY 84	B/A FY 85 Pres. Budget	Increase Requested	% Incr FY 85 Over FY 84
National Synchrotron Light Source	$11.9	$15.0	$3.1	26
Intense Pulsed Neutron Source	4.7	5.1	.4	9
Combustion Research Facility	3.2	3.5	.3	9
National Center for Electron Microscopy	1.1	1.4	.3	27
Stanford Synchrotron Radiation Laboratory*	6.8	8.0	1.2	18
Spallation Neutron Research Facility	0	.5	.5	
	$27.7	$33.5	$5.8	21

*SSRL was a new responsibility for Basic Energy Sciences in FY 1983 at $5.9 million.

Question: What is the allocation of the proposed $16.5M increase over FY 84 in materials sciences?

Answer: The allocation of the proposed operating increase in materials sciences consists of an increase for the core program and an increase for the FY 1984 advanced materials initiative. Of the $14.7 million increase for the core program, about $6.5 million is allocated for the operation of facilities including increases for such items as reactor fuel, electricity, facility maintenance and user interfacing; about $2.7 million is allocated for increased research around major facilities; and about $5.5 million is allocated to essentially continue other research at the FY 1984 level of effort. Of the $1.7 million increase for the advanced materials initiative, $1.0 million is allocated to the Stanford Synchrotron Radiation Laboratory to begin Materials Sciences sponsored research at that facility, and $.7 million is split between Lawrence Berkeley Laboratory for research at the Center for Advanced Materials and Brookhaven National Laboratory for R&D associated with construction at the National Synchrotron Light Source. Therefore, the total increase in operating funds is made up of $14.7 million for the core research program and $1.7 million for the advanced materials initiative started in FY 1984 for a total increase of $16.4 million.

Question: What is the status of the CAM proposal?

Answer: The Center for Advanced Materials (CAM) was initiated in FY 1984 with research in structural materials, polymers, electronic materials and catalysis. This portion of the original National Center for Advanced Materials (NCAM) is the materials research portion which has now been separated from the synchrotron radiation portion. CAM has an interim Director and is actively pursuing research programs and interacting with industry. The buildings associated with CAM are included in the FY 1985 request. They include the Surface Science and Catalysis Laboratory (SSCL) which was initiated in FY 1984 and the Advanced Materials Laboratory (AML) which we plan to initiate in FY 1985.

The FY 1985 budget represents a rescoping of the National Center for Advanced Materials, NCAM, proposed in FY 1984. An ad hoc review Panel which was set up to review the LBL NCAM proposal reported an affirmative response to the materials research portion of NCAM and recommended decoupling the Advanced Light Source, ALS, development and construction from the advanced materials research. The FY 1985 budget request shows this decoupling in an explicit way. The materials research portion is now called CAM, the Center for Advanced Materials. CAM includes the advanced materials research areas and the conventional construction of buildings to house the program - the Surface Science and Catalysis Laboratory, SSCL, and Advanced Materials Laboratory, AML. The synchrotron radiation light sources which were part of NCAM have now been reviewed within the total field of synchrotron radiation research by a committee which undertook a study of advanced synchrotron radiation sources. The FY 1985 budget has a continuation of the FY 1984 approved Stanford Synchrotron Radiation Laboratory, SSRL, enhancement project, but separated from CAM. The ALS has been separated from CAM and has been deferred for future consideration. Therefore, the new scope focuses on a strengthened materials research program taking into account the recommendations of the ad hoc Technical Review Panel and freeing the center from the tasks associated with construction of ALS. This materials research program is now called CAM.

In summary, in 1984 we have initiated advanced materials research in the areas of ceramic, electronic, and polymeric materials, generic research and development on future light sources with emphasis on areas brought out in the advanced synchrotron planning study, and are prepared to initiate construction projects at the Stanford Synchrotron Light Source and the Surface Science and Catalysis Laboratory (SSCL) at Lawrence Berkeley Laboratory upon release by Congress of construction funds appropriated for FY 1984. In FY 1985 we propose to continue those projects initiated in FY 1984 and, in addition, to initiate construction of the Advanced Materials Laboratory at Lawrence Berkeley Laboratory for CAM. The Advanced Light Source has been deferred for consideration in future budget requests.

Question: How much is requested in FY 85 for operating and construction and describe the need for the requested amounts?

Answer: For construction, funding for the Surface Science and Catalysis Laboratory (SSCL) is requested at $9.19 million for a building which would house the catalysis and surface instrumentation programs of Center for Advanced Materials. Initiation of the Advanced Materials Laboratory (AML) in FY 1985 is is requested at $1.6 million to house the other major programs of CAM such as the structural materials, electronic materials and polymers efforts and provide space for special equipment and offices for industrial participants.

Operating funds of $2.9 million in operating funds and $0.6 million in capital equipment is requested for the research programs started in FY 1984 and continued in FY 1985 in the areas of ceramics, polymers, electronic materials and catalysis. In addition $3.8 million in operating funds and $0.7 million in capital equipment is requested for generic research and development on future light sources including the optics center at LBL.

Question: Describe the extent of industrial participation in the project.

Answer: The Center for Advanced Materials has established a Scientific Policy Advisory Board made up of industrial representatives from IBM, Chevron, U.S. Steel and Hewlett-Packard and one representative from the University community. It will advise the Laboratory Director on directions for CAM. Each of the research subject areas have held workshops with maximum industrial participation. There have been well over 100 contacts made with industrial companies to date.

The CAM program areas include the following: catalysis, electronic materials, polymers and polymer composites, advanced high temperature structural ceramics, and advanced instrumentation for surface science. Program planning workshops have been held for several of the program areas and others are planned for the near future. Many companies have indicated their strong interest in CAM by participating in these workshops and have expressed their willingness to serve on program advisory panels. Companies, for example, Mobil, Exxon, Dow, Alcoa, IBM, Hewlett-Packard, Celanese, General Motors, Dupont, and others have demonstrated their wish to maintain close communications with CAM through individual short or extended visits and correspondence. The future assignment of Industrial Fellows to participate in the research programs is being discussed with several companies. A listing of American companies indicating interest in CAM by participating in CAM workshops will be submitted for the record.

BASIC ENERGY SCIENCES
AMERICAN COMPANIES PARTICIPATING IN CAM WORKSHOPS

ARCOR, Advanced Research & Applications, Airtron Alcoa Aluminum, American Cyanamid, Amoco Chemical Corporation, Armco Inc., Atlantic Richfield Corporation, Baker Manufacturing Company, Bell Laboratories, Bend Research, Inc., Boeing Commercial Airplane Company, Cambridge Instruments, Inc., Catalytics Associates, Inc., Celanese Research Company, Chevron Research Company, M/A Com Gallium Arsenide Products, Crystal Specialties, DeGuigne Tech. Company, Deacon Research, Dow Chemical Company, E. I. DuPont de Nemours & Co., Inc., Charles Evans & Associates, Exxon Research & Engineering Co., Filtrol Corporation, Ford Motor Company, General Instrument, General Motors Research Laboratories, GigaBit Logic, Inc., Harris Semiconductors, Helionetics, Inc., Hewlett-Packard Laboratories, Hexcel Corporation, Honeywell, Inc., Hughes Research Laboratories, IBM Research, Inland Steel, Intel Corporation, J&L Steel Corporation, Lockheed Missile and Space Co., Inc., 3-M Corporation, Maxwell Laboratories, Michigan Molecular Institute, Mobil Research and Development Co., Monsanto Company, Motorola Laboratories, National Steel Corporation, Oregon Steel Mills, Owens-Corning Fiberglass Corporation, P. Q. Corporation, Physics International, RCA Laboratories, Raychem Corporation, Republic Steel, Rockwell International Corporation, SAB Partners, Shell Development Company, Texas Instruments, Therma Wave, Inc., Union Carbide Corporation, Union Oil Company of California, United Catalysts, Inc., U. S. Steel, Varian Associates, Western Electric, Westinghouse, Xerox Corporation.

Question: What is the distribution of the proposed $13.6 million increase over FY 1984 in Applied Mathematical Sciences?

Answer: Of the $13.6 million increase, $7 million in operating funds is requested to provide access to supercomputers for the High Energy and Nuclear Physics, Basic Energy Sciences and Biological and Environmental Research programs. This access will be provided by expanding the capability of the National Magnetic Fusion Energy Computer Network. The remaining $6.6 million will be used to expand research on making efficient use of the new multiprocessor supercomputers now being acquired by DOE laboratories and to expand research on algorithms and software for future supercomputing systems being explored in universities.

Question: How much is requested for Supercomputers? How much is requested for supercomputing research and energy science advanced computation and explain the need for these activities.

Answer: A total of $29.8 million is requested for the Applied Mathematical Sciences program in FY 1985. Of this total $21.3 million is requested for an expanded long range research program in large scale scientific computing and $8.5 million is requested to expand computing access available for Energy Research supported researchers at DOE laboratories, universities and industrial laboratories.

Included as part of the FY 1985 request of $8.5 million is $3.5 million for the lease and maintenance of one supercomputer, $1.5 million in capital equipment funds for peripherals and equipment for network access facilities at laboratories and universities, and $3.5 million for support staff, to increase the computing capacity of the National Magnetic Fusion Energy Computer Network. This additional capacity will be used to supply the large scale computing needs of the High Energy and Nuclear Physics, Basic Energy Sciences, and Biological and Environmental Research programs. The need for access by Energy Research researchers is acute with only about 10 percent of program requirements currently being met. This need is documented by proposals requesting time in excess of 10,000 hours in FY 1984.

The $21.3 million in research proposed in the FY 1985 budget is essential to advance the understanding of the fundamental concepts of mathematics, statistics, and computer science underlying the complex mathematical models of the key physical processes in energy systems. Much of the scientific research and development effort throughout DOE programs is focused directly on analytical and numerical modeling of physical processes. An understanding of the fundamental principles upon which these models are based is important for developing energy systems for the future. Thus, research in mathematical analysis, algorithms, and computational techniques is crucial in conducting most scientific investigations.

Question: What is requested by other agencies for supercomputers? How do the planned DOE activities differ from those of other agencies? What is DOE doing to assure that there is no duplication of effort with other agencies?

Answer: There are three categories of plans for the use of supercomputers in the Federal agencies: (1) requests for additional capacity and capability to fulfill mission requirements; (2) requests for access to supercomputer facilities for computational science research; and, (3) long range research in supercomputer components, algorithms, and software for future parallel multiprocessor architectures.

In the first category, DOE, NASA, and DOD are planning to acquire additional supercomputers to use in production mode for mission requirements for weapons design, magnetic fusion energy research, aerodynamics studies, etc.

In the second category, the need for access to supercomputers for computational science research, documented in the Lax Report and other reports, is being addressed by DOE and NSF. DOE has requested $8.5 million to expand the National Magnetic Fusion Energy Computer Network to provide access to researchers in the High Energy and Nuclear Physics, Basic Energy Sciences, and

Biological and Environmental Research programs. NSF has requested $20 million to provide access to their researchers in universities. They are in the process of determining how to provide that access; universities, national laboratories, and private industry firms are being considered for sources of computing capability.

In the third category, long range research, DOE, DOD, NSF, and NASA have programs in basic research in applied mathematics, computer science and engineering that address the broad spectrum of questions for future supercomputing.

In DOE, the Applied Mathematical Sciences research program is focused on numerical algorithms, languages and software for large scale scientific computational modeling. This program, now increased to $21.3 million, will support applied mathematicians and computational scientists at DOE laboratories, universities, and private industry having expertise in scientific computation. The spectrum of research topics ranges from mathematical analysis of systems of equations modeling complex energy systems to algorithms for solving these equations on a variety of supercomputer architectures to studies of the design and implementation of software systems on new supercomputer systems.

The Defense Advanced Research Projects Agency's Strategic Computing program is focused on artificial intelligence techniques for expert systems, image and signal processing and speech understanding aimed toward production of "smart" weapons. This $95 million program will support computer scientists and engineers in universities and industry investigating microelectronic components, computer architectures, and software for symbolic, that is, non-numerical, processing for the "fifth generation" computers. The goal of this program is the development of small, low-power, radiation hardened intelligent systems for embedding in weapons systems.

NSF's research program in computer science, mathematics, and engineering is aimed at broad based support of universities, with emphasis on traditional educational aspects, with the goal of maintaining excellence in the Nation s pool of skilled scientists and engineers.

The other agencies in DOD, NASA, etc., have research programs focused on mission requirements.

Coordination of these activities is accomplished by participation in interagency committees and by informal but frequent contact among programs managers. The Federal Coordinating Council for Science, Energy, and Technology working groups, initiated by the Office of Science and Technology Policy, have produced two reports on aspects of the agencies' plans and these groups continue to coordinate their activities on the improved access and long range research programs. The Interagency Committee on Extramural Mathematics Programs is an ongoing activity for coordinating programs in applied mathematics research. Several studies undertaken by the National Research Council of the National Academy of Sciences have addressed the issues of research needs for the Nation related to scientific computation.

Question: Explain the need for the new ion collision physics facility, 85-ER-403. What is the total cost and annual operating costs of the Project?

Answer: The need for the new ion collision physics facility is to explore totally new and fundamental areas of atomic physics. The areas are not accessible using any facility in the U. S. today. This project will make possible the study of the physics of highly charged ions of the heaviest elements known. The project will allow the U. S. to remain competitive with other countries in accelerator-based atomic physics research.

These arguments are supported by a letter of transmittal of a 1976 report by the National Research Council on accelerator-related atomic physics research which is provided for insertion into the record. The report is one of two reports that recommends increased support for accelerator facilities, the other being a 1980 report which strengthens this recommendation. The research is of practical value to the development of fusion energy and to the development of x-ray lasers.

The total cost of the project is $4,000,000 of which DOE is to provide $3,400,000 over a two year period, $2,000,000 in FY 1985 and $1,400,000 in FY 1986. Kansas State will provide the additional $600,000 for housing of the facility. The operating costs associated with this construction project will be $700,000 in FY 1987.

LETTER OF TRANSMITTAL RELATING TO THE REPORT OF THE AD HOC PANEL ON ACCELERATOR-RELATED ATOMIC PHYSICS RESEARCH

Assembly of Mathematical and Physical Sciences
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

Gentlemen:

This report deals with the emergence of an increasingly important new subfield of physics, in which accelerators are used for the study of atomic inner-shell transitions, collisions, and the properties of highly ionized and excited atoms. While the excitation and subsequent behavior of atomic inner shells have long been studied in connection with x rays and Auger electron their systematic study in connection with the collisions of heavy ions is a relatively new field of endeavor. The report outlines the present research activity in this new area, its recent accomplishments, many of its open problems, and its prospects and challenges. It also outlines some of its current connections with practical areas of application, ranging from the detection of trace species by x-ray fluorescence analysis to the measurement of the collisional and radiative properties of highly excited impurity ions that are expected to have a crucial influence on the behavior of plasmas in fusion reactors.

The new field of research in atomic inner-shell and high-energy collision processes and spectroscopy depends on the use of accelerators operating in energy ranges that were recently considered the exclusive domain of nuclear physics. Without the existence of current accelerator resources, which were constructed almost exclusively for nuclear research purposes, knowledge in this new area of inner-shell physics would be almost nonexistent. Its development and present state of high activity testify to the fruitful consequences of interactions in both resources and personnel between the areas of physics classified, respectively, as nuclear and atomic science.

Because of its dependence on facilities of substantial size and cost, accelerator-related atomic physics requires special attention on the part of funding agencies responsible for both pure and applied research in its field; because it has thus far been able to grow through the use of accelerators that were initially constructed under nuclear auspices, full recognition of the needs of this promising research field has not had to be faced in the budgeting process. It is clearly unwise for the resources available to this field to remain dependent on decisions that are determined primarily by the changing priorities of nuclear science. The Panel that has prepared this report recommends that the special needs of this field be explicitly recognized and responsibility assumed by appropriate agencies of the federal government.

The peculiar position of this subfield, closely associated with nuclear physics in its needs for major facilities, but having its basis of concepts and common language in atomic and molecular science, calls for special and continuing effort in maintaining liaison and information flow among the communities that are involved. The Panel's report points to these needs and recommends actions to meet them. In carrying out its task the Panel has also provided a significant and interesting summary of a promising field of scientific endeavor.

Yours sincerely,

/signed/

Felix T. Smith, *Chairman*
Committee on Atomic and
Molecular Science

Question: Why was GPP funding responsibility for Argonne shifted to the BES program? What was the funding level in FY 1984?

Answer: It has been the practice of the DOE to assign GPP funding responsibility for a given laboratory to the program providing the greatest amount of support to that laboratory. In FY 1984 and prior years, the Assistant Secretary for Nuclear Energy's (NE) Breeder Program budgeted these funds for ANL. An analysis of funding trends to ANL prior to the submission of the FY 1985 budget showed declining Breeder Program support to ANL, most of which went to ANL-West, and that the Office of Energy Research's Basic Energy Sciences program was increasing its support of ANL activities. Thus, the decision was made to transfer funding responsibility to the BES program in 1985, particularly in light of the CRBR cancellation and the general uncertainty regarding breeder funding in the outyears. This decision was made in conjunction with the DOE's decision, during the internal formulation of the FY 1985 budget, to increase FY 1985 GPP funding for all the multiprogram laboratories. This was a conscious management effort to reverse the recent trend of deteriorating facilities at these laboratories due to the inadequacy of GPP resource availability to the laboratories.

The Breeder Program provided $1.6 million in GPP funding to the Argonne National Laboratory in FY 1984. This level of funding was felt to be inadequate given the capital investment at ANL and the FY 1985 budget request of $5.0 million is considered a more appropriate funding level.

Magnetic Fusion Energy

Question, When will be close to economic feasibility of fusion power? In your view, will we reach this point before 2030?

Answer: We think there are three fundamental steps that must be taken before an assessment of fusion's economic feasibility could be made by the private sector. The first step is the achievement of generating as much energy by fusion as it takes to create the fusing plasma. We plan to attempt this achievement in the Tokamak Fusion Test Reactor (TFTR) which was commissioned at Princeton a year ago. The plan calls for a steady preparation for the actual "energy breakeven experiments" in late 1986.

As our confidence has grown that the energy breakeven experiments will be conducted successfully, we have begun technical studies for the succeeding step, that of achieving an ignited and long pulse equilibrium burn in a fusion plasma. This second step would be the last major science step required to prove that operation of the core of a fusion energy system is feasible. At the same time, we would be working to improve the best confinement concepts to ensure that a fusion energy source could be most economically competitive.

Following the successful operation of a burning core experiment, there would need to be one further step, that of an engineering test of all the fusion power handling equipment required in a complete energy system.

With the successful completion of this engineering test, we believe the private sector would have the technical information base from which to make an assessment underlying the initial decisions about commercialization. At this point, the prospect for economic feasibility will be a determining factor in deciding to build any full scale energy system. An actual determination of fusion's economic feasibility could only come after the private sector had some practical experience with one or two generations of working fusion energy systems.

The timing of both the assessment of the future economic prospect and later the market-place determination of economic feasibility of fusion clearly depends upon the number of years required for each step and the interval between decisions. In the DOE's view, if we were able to start toward the second step in the next few years, then by the mid 1990's we would have a strong indication of fusion's likely future. Further, if we could start on the third step in the mid 1990's, then we could provide the technical information for the private sector assessment of the prospect for economic feasibility shortly after the turn of the century. If the private sector's assessment resulted in commercial construction of fusion energy systems:, then fusion's economic application would begin in the period 2020 - 2030, during which time the first commercial plants would be operational.

Question: How much has been the total amount spent by the Federal Government on magnetic fusion research? What is the projected level of funding for the next five years?

Answer: Over a 33 year period, starting in FY 1951 and going through FY 1984 the Federal Government has spent a total of about $4 billion to support research on magnetic fusion technology. It is anticipated that, for the near term future, fusion will be supported at a level of effort approximately the same as that of FY 1985.

Question: What has been done and how much spent to date on the Tokamak Fusion Core Experiment (TFCX)?

Answer: Preliminary studies began in FY 1984 to select a machine configuration for TFCX. The technical work of developing technical options, conducting cost sensitivity studies and identifying necessary supporting research and development is being conducted by a national design team with members from fusion laboratories under the direction of the Princeton Plasma Physics Laboratory. We expect to select a reference concept this summer for conceptual design studies next year. Expenditures by the design team have been about $1.5 million for direct support of this TFCX concept definition work. Additionally, the Fusion Engineering Design Center and other fusion laboratories are conducting studies that support the TFCX design as part of their ongoing activities. This additional activity has also spent about $1.5 million.

Question: What is the anticipated total cost of the TFCX?

Answer: The machine configuration for TFCX will be selected late in FY 1984. Conceptual design work in FY 1985 will then provide an estimate of the TFCX cost and schedules that the Department will use to estimate overall project cost. Any request to the Congress for a TFCX project will be based on the results of the FY 1985 conceptual design work. The options for the TFCX configuration that we are examining now have very preliminary cost estimates ranging from $0.5 to $1.0 billion for construction cost.

Question: Explain the need for $12.3 million increase in operating expenses. How will this be utilized?

Answer: The increase of about 3% for magnetic fusion in the FY 1985 budget is slightly less than cost of living. This will allow the program to maintain a course of steady progress and will protect the investment made by the Government in this program to date. At the requested level physics research on the two most advanced concepts, tokamaks and tandem mirrors, as well as a technology development program to support the base scientific program will continue. In addition, support is provided for developing supporting confinement experiments which contribute to the general base of technical knowledge underlying the main concepts. The proposed program will allow us to address key physics issues related to heating, confining, and controlling a plasma as well as the reactor technology and design issues associated with a long pulse ignited tokamak. Together the physics and technology research efforts form the essential elements of a base program with the objective of developing a commercially attractive reactor concept.

Question: What is the total amount requested for the FMIT project? Why is $3 million needed for construction? What is the status of efforts to provide international cooperation on the project?

Answer: The total amount requested for FMIT in fiscal year 1985 is $6.2 million consisting of $3 million for construction and $3.2 million for research and development. The $3 million of construction funds, augmented by about $10 million of international funds are needed in order to continue FMIT construction activities such as procurement of hardware and to start facility construction. Regarding the status of efforts to provide international cooperation, the Department has made a strong effort to begin substantive discussions with Japan and the European Community (EC). On March 1, 1984, representatives of the Department presented a specific proposal on FMIT collaboration to governmental representatives of Japan and the EC. The Japanese are favorably inclined to begin substantive discussions; however, the reaction of the EC has not been as positive. A meeting between the U.S. and EC has been scheduled for April 10 to clarify the EC position.

However, if the Department cannot succeed in arranging such international collaboration, we would not proceed with the project. The FY 1985 funds would then be used to terminate construction activities on the project and bring the R&D efforts to a logical conclusion. This plan would be executed in a manner which would protect the Government's significant investment in this project to date and would allow efficient restart of the project at a time when international collaboration is possible.

Question: How much is requested for EBT and how will this amount be used in FY 85?

Answer: The amount requested by DOE for the EBT program is $8.5 million ($7.6 million operating, $0.9 million capital equipment). ORNL would receive most of the funds with the remainder going to several private industries.

ORNL is presently completing an intensive effort to enhance EBT-S performance, increase confidence in the technical data base, and develop advanced configurations which are possible concept improvements. We are conducting an assessment of the results of this effort, and we will also have input later this year from MFAC on management issues and possible high leverage technical opportunities for the entire supporting concepts program, including EBT. At the conclusion of this assessment, a decision will be made on the future direction of the program. However, we anticipate that a major element of the FY 1985 EBT program will be continued development of radiofrequency heating which is also applicable to the mainline research concepts.

Biological and Environmental Research

Question: Provide a breakdown of all activities within this program and the levels of BA and BO in FY 83, FY 84, and FY 85.

Answer: I will be pleased to provide that information for the record.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH
BREAKDOWN OF ACTIVITIES
(Dollars in thousands)

	FY 1983		FY 1984		FY 1985	
	BA	BO	BA	BO	BA	BO
1. Late Effects on Health and Environment of Energy Development and Use	$125,802	$131,936	$124,006	$139,132	$128,507	$128,507
a. Source and Dose Determination	10,275	11,296	10,161	11,916	10,300	10,300
Characterization and Measurement	2,814	3,092	1,280	1,820	1,300	1,300
Develop New Concepts	7,461	8,204	8,881	10,096	9,000	9,000
b. Environmental Fate and Behavior	29,498	30,582	28,267	31,958	32,726	32,726
Atmospheric Transport	7,740	8,509	7,169	8,812	12,220	12,220
Environmental Mechanisms/Cycling	21,758	22,073	21,098	23,146	20,506	20,506
c. Health Effects	66,028	66,668	62,683	68,719	57,274	57,274
Human Health Research	25,110	22,433	25,229	25,961	24,620	24,620
Health Effects/Biological	40,918	44,235	37,454	42,758	32,654	32,654
d. Basic Biology	20,001	23,390	22,895	26,539	28,207	28,207
Health Effects/Biological	15,365	18,294	18,683	21,104	23,628	23,628
Physical/Technological	4,636	5,096	4,212	5,435	4,579	4,579
2. Risk Analysis	1,780	1,966	1,800	1,800	0	0
3. Nuclear Medicine	17,263	17,790	19,700	21,152	20,665	20,665
4. Carbon Dioxide Research	9,103	9,825	12,500	13,628	13,418	13,418
5. Program Direction	3,350	2,716	3,600	3,600	3,475	3,475
6. Facility Operations	27,304	30,451	22,344	26,003	23,051	25,796
Operating Expenses	11,327	12,384	11,644	12,538	12,051	12,051
Capital Equipment	12,877	12,333	8,300	9,270	8,000	7,300
Construction	3,100	5,734	2,400	4,195	3,000	6,445
Total BER	$184,602	$194,684	$183,950	$205,315	$189,116	$191,861

Question: Briefly outline the benefits derived from the nuclear medicine program. Does your FY 85 request enable the program elements to continue without reduction?

Answer: The DOE Nuclear Medicine program has played a major role in developing the special techniques used in over 60 million diagnostic and therapeutic procedures per year. In addition, the program's contractors have designed and built most of the diagnostic instrumentation now used in nuclear medicine, such as the positron emission transaxial tomographic scanner, gamma camera, and the rectilinear scanner. High purity stable isotopes of carbon, oxygen, and nitrogen are also produced in large quantities for use in medical, biological, and agricultural research. These stable isotopes help detect diseases and make it possible to follow the behavior of pollutants in man. Since there is no danger from radiation, stable isotopes are particularly useful for diagnostic procedures in infants and pregnant women.

Nuclear medicine examinations are increasingly important in the diagnosis, monitoring and therapeutic assessment of structural and functional abnormalities affecting most parts of the human body. They are, for example, the best method for diagnosing pulmonary blood clots so that the appropriate treatment can be selected, for monitoring renal transplant recipients to avoid potential rejection of the donated kidney; and for assessing patients with bone cancer to know whether to use radiation or surgery as a treatment modality. The use of nuclear medicine techniques for cardiological examination is a rapidly growing subspecialty because the function and integrity of heart muscle can be screened more accurately and noninvasively to decide whether to do cardiac surgery. Children with congenital hip disease can be diagnosed earlier before irreversible damage occurs. In general, nuclear techniques have changed the practice of medicine, allowing the doctor to observe the function of specific organ systems in the human body. They have reduced the need for invasive procedures and exploratory surgery, made hospital stays shorter, less painful and dangerous, and have greatly expanded the doctor's arsenal in his fight against disease and human suffering.

Within the FY 1985 request, the major priority will be to maintain the current level of effort to develop new medical applications of nuclear technology using radiation, radioisotopes, stable isotopes and ion beams. Clinical studies which have shown a procedure to be feasible will be completed while the development of new organ function and imaging techniques will be slowed somewhat to provide modest flexibility for program development in existing research projects.

Question: Explain the proposed increase in FY 85 for university research support?

Answer: The major increase in the University Research Support budget for FY 85 is for the University Laboratory Cooperative Program, which is designed to foster cooperative relationships between universities and the national laboratories. This is accomplished through the support of such activities as undergraduate student appointments, summer faculty and sabbatical research appointments, and graduate student thesis research.

With the proposed increase in FY 85 we expect to double the number of student research appointments and give increased attention to faculty sabbatical appointments. These latter appointments are important to the development of strong and continuing ties with the universities. Both the universities and DOE are involved in the support of these appointments and both benefit from the results.

There has been a growing need for new young talent in many research and energy technology development areas. Our national laboratories provide an unmatched opportunity for young people and the faculty who teach them, to become involved with ongoing research of close interest to the Department. The laboratories have also requested opportunities to increase their interaction with university faculty and students in this area. In addition, in order to continue to attract top quality students a small increase in student stipends will also be provided.

STATEMENT OF HON. DONALD PAUL HODEL, SECRETARY OF ENERGY

PREPARED STATEMENT

Chairman HATFIELD. Mr. Secretary, you may proceed with your statement.

Secretary HODEL. Mr. Chairman, I have a prepared statement which I would like to submit for the record, if I may.

Chairman HATFIELD. It will be made part of the record in full.

[The statement follows:]

STATEMENT OF DONALD PAUL HODEL

Mr. Chairman and Members of the Committee, I appreciate the opportunity to present you with the FY 1985 budget of the Department of Energy. This budget strongly supports the Department's responsibilities in its three mission areas: Energy, General Science, and National Defense. The budget for energy programs was developed in concert with the fourth National Energy Policy Plan, published in October 1983, and fully supports the goals and strategies set forth in that document. For that reason, a summary of the Plan is a useful way to begin a discussion of the FY 1985 budget.

NATIONAL ENERGY POLICY AND STRATEGIES

The overall goal of national energy policy is to foster an adequate supply of energy at reasonable costs. The policy recognizes that "adequate supply" requires flexibility in the energy system, with no undue reliance on any single source of supply. The goal of "reasonable costs" suggests economic efficiency within the energy system, so that energy consumers; individuals, and commercial and industrial users alike; are not penalized by economic rigidities introduced into the system by ill-advised governmental regulation.

The strategies for achieving this energy policy goal are:

- To minimize Federal control and involvement in energy markets while maintaining public health and safety and environmental quality.

- To promote a balanced and mixed energy resource system.

The implementation of these strategies is evident in both the Department's legislative program and the FY 1985 budget. Legislatively, the Administration attaches the highest priority to removing controls on wellhead prices of natural gas. The current system of price regulation distorts the allocation of this vital energy source and prevents energy consumers from enjoying the benefits of competition. A second major legislative initiative seeks to reform the nuclear licensing and regulatory process. Nuclear regulatory reform will improve nuclear safety and bring greater rationality, predictability, and stability to the nuclear licensing process. Through these initiatives, two major components of the Nation's energy supply, natural gas and nuclear power, will be free to contribute to the energy economy by not being subject to distortions introduced by unnecessary regulation.

The FY 1985 budget implements the strategy by supporting development of a mix of technologies that can contribute to energy supply and end-use energy efficiency. In allocating our resources, we are concentrating on applying Federal funds only where they are most effective; in sponsoring longer-term, high-risk research and development where the potential payoff is high but which private industry cannot be expected to pursue. The budget continues this Administration's policy against funding commercialization activities which are the proper province of the private sector.

DEPARTMENTAL ORGANIZATION

To further our progress in implementing the National Energy Policy Plan and improve management of our national security programs, I realigned certain management responsibilities within the Department in late January. No functions were eliminated by this reorganization, but our ability to manage certain critical programs was strengthened.

The most significant change involves the transfer of all functions previously under the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness to other organizational elements. Emergency preparedness planning and operations are now the responsibility of the Assistant Secretary for International Affairs and Energy Emergencies, reflecting the close relationship between emergency planning and international energy security. Environmental policy and oversight and responsibilities for nuclear facility and operational safety goes to a new Assistant Secretary for Policy, Safety, and Environment. This ensures closer integration of environmental and safety policy with overall energy policy development and elevates policy development activities to the level of Assistant Secretary. Environmental research and development remain the responsibility of the Director of Energy Research. Management of the Strategic Petroleum Reserve and the Naval Petroleum and Oil Shale Reserves is transferred to the Assistant Secretary for Fossil Energy, thus centralizing the responsibility for all fossil resource management and research and development.

Mr. Jan Mares, who was Assistant Secretary for Fossil Energy and Acting Director of the Office of Policy, Planning, and Analysis, has assumed the new position of Assistant Secretary for Policy, Safety, and Environment. Mr. William Vaughan, formerly the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness, has assumed the position of Assistant Secretary for Fossil Energy.

Another element of the reorganization, which I plan to implement upon the nomination and confirmation of a Director of the Office of Civilian Radioactive Waste Management, concerns the Uranium Enrichment program. An Office of Uranium Enrichment will be established reporting to the Secretary, with day-to-day management oversight provided by the Director of the Office of Civilian Radioactive Waste Management. The Office of Uranium Enrichment will be responsible for all enrichment programs except research and development of advanced technologies which will remain in Nuclear Energy. This arrangement should facilitate the business management operations of both the waste and enrichment programs and capitalize on existing expertise available in the Department in dealing with utilities and other outside interests on these important programs. This will also strengthen the opportunity for the Assistant Secretary for Nuclear Energy, Shelby T. Brewer, to focus on the long-term direction of our nuclear energy research and development and to address the problems facing this important energy source.

Other elements of the reorganization include the establishment of a new Deputy Assistant Secretary for Intelligence in the Office of the Assistant Secretary for Defense Programs, and a new Assistant Administrator for Enforcement in the Economic Regulatory Administration to manage the settlement and litigation of alleged violations of oil price controls.

THE CURRENT ENERGY SITUATION

Last year I stated that the Nation faced a more favorable energy situation than at any time in the previous ten years. Oil imports were down significantly, and our dependency on oil from potentially insecure sources had declined as more use was made of imports from Mexico and the North Sea. Conservation was being widely practiced, and we had become much more efficient in using energy. Finally, the mix of energy sources had changed so that most of the growth in energy in that decade had come from coal and nuclear power rather than from oil and natural gas, which had been the norm previously.

Today, that description of a more favorable energy posture remains valid. Our oil demand for 1983 is estimated to have been 15.1 million barrels per day, the lowest annual consumption figure since 1970. It is estimated that net imports in 1983 were about 4.0 million barrels per day, 4.2 million including imports for the Strategic Petroleum Reserve, a very slight decrease from the 1982 level, and less than half the amount we were importing in 1977. Also, we remain much less reliant on imports from the Persian Gulf. Mexico is our largest supplier, and no Persian Gulf exporter is among the top five. Although 1984 may see the first yearly increase in world oil consumption since 1979, the fundamental underlying softness in the oil market is expected to continue. The financial requirements of a number of producing countries, the uncertainties surrounding the situation in Nigeria, and the continued increase in non-OPEC oil production may create a climate that will make it very difficult for the members of OPEC to stave off further cuts in oil prices.

Another important measure of our energy security is the Strategic Petroleum Reserve, which now contains over 380 million barrels of oil, approximately 90 days of our estimated 1983 net oil imports, and almost 1000 days of our estimated 1983 imports from the Persian Gulf region.

Although the present situation is favorable, we must be prudent in what we do in response to the "breathing room" given us. Even though we are much less dependent on the Middle East for oil than before, the economies of Europe and Japan are still quite vulnerable. This is why we have encouraged those countries to increase their level of emergency preparedness. The international economy is heavily interdependent, and instability in the Middle East producing region could lead to events that could have an effect on their economies as well as ours. The present situation does not call for complacency but for the resolve to take advantage of an opportunity to continue the course for a secure energy future.

BUDGET OVERVIEW

The FY 1985 budget for Department of Energy programs is $15.1 billion, including $1.9 billion in off-budget oil acquisition and transportation funds for the Strategic Petroleum Reserve. The application of prior year balances reduces the need for new budget authority to $14.9 billion. Anticipated outlays in FY 1985 are $13.8 billion, and proprietary receipts collected by the Department are estimated at $2.2 billion.

A new feature of this budget is the savings we anticipate as a result of management initiatives that are being put in place to bring about greater efficiency of operations. Management reform is a priority issue throughout the Federal government. The Office of Management and Budget is directing a six-year management improvement effort entitled Reform 88, which has identified a number of areas where significant gains in governmental efficiency and cost effectiveness can be expected. The President's Private Sector Survey on Cost Control, also known as the Grace Commission, made many specific recommendations for cost savings in its 1983 report. In addition, the Energy Research Advisory Board and the White House Science Council looked at ways to improve the effectiveness of the Department's field offices and laboratories. In response to these various recommendations, the Department is undertaking a number of management initiatives which should result in savings of $47.5 million in FY 1984 and $96.0 million in FY 1985. The attainment of these savings will reduce the need for new budget authority in FY 1985.

The FY 1985 request represents an increase of 19 percent over the amount appropriated in FY 1984 plus proposed supplemental funding requests. This increase results from higher funding levels proposed for the Strategic Petroleum Reserve, Defense Activities, and General Science, which more than offset a decrease in the request for Energy programs.

Energy programs comprise about 26 percent of the Department's FY 1985 budget. In absolute terms, the request for energy programs is about six percent below the FY 1984 level. Within energy research and development, the Basic Energy Sciences program is increased significantly, reflecting the Administration's emphasis on long-term basic research and the availability of important new facilities. Most other major elements of energy research and development show relatively slight changes from FY 1984 appropriation levels, except for Fossil Energy and Solar and Other Renewables, which nonetheless are proposed at levels well in excess of the President's FY 1984 budget request. The FY 1985 budget for Conservation Research and Development is only $3 million below the FY 1984 Congressional appropriation, but is more than twice the President's FY 1984 request. Fossil Energy is proposed at almost twice the FY 1984 request level, and Solar and Other Renewable Energy programs are increased approximately 87 percent above the previous year's request. These significant changes in our proposed budgets reflect the commitment to support a mix of technologies, which is one of the strategies to achieve our energy policy goal.

A major change in this budget is an initiative to continue funding certain conservation grant programs from sums collected by the Department of Energy as a result of settlements, orders or judgments involving overcharges resulting from alleged petroleum pricing and allocation violations under the Emergency Petroleum Allocation Act of 1973, which are not or cannot reasonably be refunded to injured persons. We will propose legislation to establish a Petroleum Overcharge Restitution Fund which will provide the source of funds for the grant programs. The Fund will be established in a manner that allows for any shortfall in revenues to be made up from the general fund of the Treasury. Whereas in FY 1984 we sought no funding for these programs, the FY 1985 request, assuming enactment of the legislation, totals $238 million, the same as the FY 1984 appropriation.

The Strategic Petroleum Reserve budget of $2,337 million will permit an average annual fill rate of 145,000 barrels per day in FY 1985 and a strong program of facilities development. Under this budget, 482 million barrels of oil should be in storage by the end of 1985, which is about 64 percent of the planned capacity of 750 million barrels.

General Science programs, designed to probe the basic fundamentals of matter and energy, are up about 16 percent over FY 1984, due in large part to increased construction funding for major research facilities.

Defense Activities account for slightly over half of the Department's FY 1985 budget. The request for $7,806 million will permit us to meet the requirements of the Department of Defense for nuclear weapons and special nuclear materials, and to continue the modernization and upgrade of aging facilities.

Finally, supporting activities, primarily accounted for in the Departmental Administration appropriation, decline slightly from FY 1984, primarily as a result of the introduction of improved management practices.

I would now like to discuss the funding requests for selected major programs.

CONSERVATION

The Department's conservation activities include research and development in a variety of technology areas and grants to State and local governments.

Within Conservation research and development, program funds support activities in the building and community systems, transportation, and industrial end-use sectors, as well as a broad gauged multi-sector program of basic research and development. The FY 1985 budget provides program funding of $148 million for conservation research and development, which is almost equal to the FY 1984 appropriation and more than twice the FY 1984 request. Building wall and roof systems, indoor air quality, infiltration and ventilation, lighting and retrofit of existing buildings will be primary areas of research activities in the Buildings program. The Transportation program will continue to support private sector efforts to improve the energy efficiency of vehicle systems, with particular emphasis on continued development of the automotive gas turbine and research in adiabatic diesel technology and advanced batteries for electric and hybrid vehicles. The request also provides funds to complete construction of the High Temperature Materials Laboratory.

The Industrial program will continue to provide the technology base to support development of technologies for waste heat recovery and more efficient industrial processes. The multi-sector program will emphasize research in thermal sciences, biocatalysis, and tribology. In addition, funding for evaluation of invention proposals and support for the most promising among them is proposed.

Support will continue for the Low Income Weatherization and Schools and Hospitals grant programs, utilizing funds recovered in settlements of oil pricing and allocation violations during the period of price controls which are not or cannot reasonably be refunded to injured persons. The proposed funding level of $238 million is equal to the amount appropriated for FY 1984.

SOLAR AND OTHER RENEWABLES

The renewable energy technologies show substantial potential as energy supply alternatives across virtually all major segments of the energy market. Solar and other renewable energy technologies, including solar thermal, solar buildings, photovoltaics, biofuels, wind, ocean, and geothermal options, promise increased diversification within the Nation's future energy supply infrastructure.

The budget request in this area is substantially larger than the FY 1984 request. The incorporation of previously discussed Departmentwide cost savings measures, coupled with completion of several expensive projects, makes it possible to present a program at levels slightly below the prior year's appropriations.

We are convinced that, at requested funding levels, the renewable energy program will maintain the momentum established to date by the industrial and federal research community. We fully intend to continue development of virtually all major technology options at a reasonable and businesslike pace. The funds requested for this area permit us the flexibility to expand or open up several avenues of technical investigation and improve upon an established technology transfer activity.

FOSSIL ENERGY

The program level proposed for the Department's fossil energy programs in FY 1985 is $273 million. Although this is about 20 percent below the FY 1984 appropriation, it is virtually twice the FY 1984 budget request, and reflects the Department's strong commitment to supporting a mix of technology alternatives. The coal budget of $178 million continues to address generic research, technology base development, and environmental research. An integrated acid rain research effort cutting across virtually all programs is a feature of this budget. Coal cleaning and preparation and improved combustion systems are among the technologies being developed to permit the Nation's vast coal reserves to be used in an environmentally sound manner. Efforts in magnetohydrodynamics will be redirected to a multiyear program consisting of advanced scientific research and an integrated system test. Research and development into a number of promising synthetic fuels technologies continues in the coal liquefaction and gasification programs.

Petroleum research is proposed at a level above the FY 1984 appropriation, with emphasis on enhanced oil recovery. The gas budget continues activities in Western tight gas sands and Eastern gas shales, and proposes advanced research on the energy potential of methane hydrates and deep source gas.

NUCLEAR ENERGY

The Department's nuclear energy programs are designed to provide the technological base to support industry's efforts to revitalize the development of nuclear power as an economic and environmentally acceptable source of base-load electric power.

The Department's budget request in FY 1985 is $618 million. The largest program elements in the budget are Breeder Reactor Systems ($308 million) and Remedial Action ($152 million). The Breeder Reactor Systems budget is well below the FY 1984 appropriation, because the program has been restructured significantly since the failure to appropriate FY 1984 funds for the Clinch River Breeder Reactor (CRBR) led the Department to initiate termination activities. No FY 1985 funding is required for CRBR termination. As now constituted, the breeder program focuses on resolving technology issues that are key to achieving a safe, reliable, and economically competitive breeder for introduction by the private sector early in the next century. Our confidence in the technical merit, safety, and licensability of breeder reactors was recently confirmed by the action of the Nuclear Regulatory Commission in issuing a Memorandum of Findings favorable to the CRBR. This action would have been sufficient to authorize issuing a construction permit had the project continued. The Clinch River Project has produced valuable experience in the areas of design, component testing, and licensing. This information will be retained for use in the restructured base technology program. A priority element of the program will be a substantial increase in international collaborative efforts.

In FY 1984, activities related to the conceptual baseline design of a proposed large High-Temperature Gas-Cooled Reactor (HTGR) will be completed and available for work with NRC. Efforts will also be initiated on design studies utilizing passive cooling systems for decay heat for both a small integrated system and a modular system. Efforts in FY 1985 will be further refocused to evaluate the potential of small HTGRs for unique domestic and international markets. In addition, the development of the technology base needed for HTGR electric and process heat applications will be supported. These activities and objectives are consistent with the current policy of support for long-leadtime, high-technology advanced concepts that cannot be fully supported by the private sector.

The Remedial Action program has the objective of treating or stabilizing radioactive wastes and performing decontamination and decommissioning at surplus DOE and certain non-government facilities and sites. Funding for FY 1985 is proposed at a level which is more than 50 percent higher than was provided in the FY 1984 appropriation. The increase is concentrated in three areas: inactive uranium mill tailings sites; surplus facilities (primarily Shippingport, Pennsylvania); and the former reprocessing facility at West Valley, New York. The remedial action program has matured to a point where funding at approximately this request level will be required for a number of years, to achieve the cleanup schedules proposed in authorizing legislation.

NUCLEAR WASTE POLICY ACT

Important elements of the Department's nuclear waste activities have been designed to support the goals of the Nuclear Waste Policy Act of 1982, which was signed into law on January 7, 1983. The Act created the Nuclear Waste Fund, which provides for commercial radioactive waste disposal services and for the study of monitored retrievable storage (MRS). The Fund is financed by fees collected from civilian nuclear utilities. The Department is given authority to expend Fund resources through annual appropriation acts. The appropriation request for FY 1985 is $327.7 million, slightly higher than the FY 1984 level. Revenues are estimated to be $377.8 million, assuming that beginning in FY 1985 the fee will be adjusted in accordance with the Administration's economic assumptions. The Department is permitted to incur obligations up to the appropriated amount even if there is a shortfall in the revenues paid into the Fund, through authority to borrow from the Treasury.

The Department has identified nine potentially acceptable sites in six states for the first repository. These nine will be narrowed to three in in a phased process by January, 1985, and a final site will be recommended to Congress in 1990. Also, literature studies are being conducted in crystalline rock in seventeen states as potential candidates for the second repository.

Systems analyses and concept evaluations for an MRS program have been completed. Development of facility design concepts will be initiated in FY 1984, leading to a proposal to Congress in FY 1985 on the need for and feasibility of an MRS.

Another element of the Nuclear Waste Policy Act is the civilian waste research and development program. The FY 1985 request of $27.6 million is more than double the previous year's level, and provides funding for cooperative demonstrations to encourage efficient at-reactor storage; alternative disposal concepts, such as subseabed disposal; and generic research and development studies in support of civilian waste management activities.

Both the Waste Fund activities and the research and development elements of the program are managed by the Office of Civilian Radioactive Waste Management, which was established by the Nuclear Waste Policy Act.

BASIC ENERGY SCIENCES

This program is responsible for generic long range energy related research which has applications to all of the Department's technology development programs. The budget for FY 1985 is $420 million, a significant increase over the $337 million appropriated in FY 1984. FY 1985 funds will support use of important facilities: the National Synchrotron Light Source, the Intense Pulsed Neutron Source, the 1.5 MEV high voltage electron microscope, the Atomic Resolution Microscope, and the Stanford Synchrotron Radiation Laboratory. Also, first steps will be taken to expand energy research computing activities to meet immediate needs for supercomputer access by the Department's energy research staff.

GENERAL SCIENCE

The Department's General Science programs support basic research into the fundamental constituents of matter. This research contributes to advances in all scientific disciplines and broadens and deepens the technology base. The budget request is $746 million, a 16 percent increase over the FY 1984 appropriation. The research is conducted in two programs, High Energy Physics and Nuclear Physics. These programs make use of a number of large, advanced accelerators and other research facilities which in many cases are unique in the world. In FY 1985 preliminary research will be undertaken for the design of the next generation particle accelerator, designated the Superconducting Super Collider, in the High Energy Physics program, and in Nuclear Physics construction will be initiated on the Continuous Electron Beam Accelerator Facility.

STRATEGIC PETROLEUM RESERVE

The FY 1985 budget for the Strategic Petroleum Reserve is $2,337 million, which includes $1,890 million for oil acquisition and transportation off budget and $447 million on budget, primarily for facilities development. The request will permit an average annual fill rate of 145,000 barrels per day in FY 1985, with 26.5 million barrels on order for delivery in FY 1986. At the end of FY 1985, there will be 482 million barrels of oil in storage, which is approximately 64 percent of the 750 million barrel reserve planned by 1991. In view of the Nation's improved energy situation and much reduced reliance on insecure foreign sources of oil supply, the Department's budget and plans for development of the Reserve will provide an increasing measure of protection from energy emergencies, including supply interruptions. Within the Facilities Development program, funds are provided for full scale development of the new storage site at Big Hill, Texas.

DEFENSE ACTIVITIES

Defense Activities accounts for about 52 percent of our budget request for FY 1985. The request of $7,806 million meets the requirements of the Defense Department for weapons production & testing, together with research and development on new and improved weapons, production of special nuclear materials, and Naval reactor development. Within the Weapons Activities area production activities will involve nine weapons, and preproduction efforts will be conducted on several additional systems.

Increased funding is requested for the Verification and Control Technology program, which aids in nuclear weapons treaty verification, arms control, intelligence, and nuclear export control. Major activities in FY 1985 include continued satellite sensor development.

A major program element is the Defense Waste and Byproducts Management program, which has a budget of $753 million in FY 1985. In FY 1985, efforts will continue to provide for the safe handling and interim storage of all defense radioactive wastes as they are produced, including upgrading waste handling, storage, and waste disposal operations by transferring high level waste from old single shell tanks at Savannah River and Hanford into new double shell tanks. Construction of the Defense Waste Processing Facility at Savannah River and the Waste Isolation Pilot Plant in New Mexico will continue.

Safeguards and security at the Department's weapons facilities are receiving special attention. A supplemental appropriations request of $158 million is being proposed in FY 1984 for this purpose, as well as to fund environmental protection improvements and unanticipated state tax liabilities.

URANIUM ENRICHMENT

Ten years ago the United States had a monopoly on the production of enriched uranium. Today, our share of the global enrichment market has dropped significantly due to a worldwide excess of enriched uranium, increasing foreign competition, and the emergence of a secondary market for enriched uranium. DOE's market practices have not kept pace with the changing circumstances. As a result, enrichment revenues are beginning to erode, thus limiting the funds available for investment in more modern enrichment capacity.

Over the past year we have analyzed the situation carefully, considered alternative options, and developed a strategy that we believe will significantly improve our market position. Our most pressing needs are to stabilize our market share, to provide for an orderly drawdown of excess inventories of enriched uranium, and to stem the tide of customers who are going elsewhere for their enriched uranium. Consequently, our first step is to offer a new contract with terms sufficiently attractive to interest potential customers and to keep our present customers satisfied. This step was taken on January 18th, with the issuance of a new Utility Services (US) enrichment contract. This new contract offers several competitive features including a lower price with a long-term price ceiling, the ability to purchase a portion of uranium requirements from foreign suppliers or the secondary market, and ordering and delivery provisions that are substantially more flexible than those of current contracts.

The second element of our strategy is to plan and conduct the activities in all areas of the uranium enrichment enterprise in an efficient and cost-effective manner. With regard to existing production capacity, we have initiated intense discussions with TVA to obtain relief from the demand charges for unused power. Additionally, we are introducing more effective cost control measures into our gaseous diffusion operations. As market data are obtained from customer response to the new contract, we will adjust our outlays in proportion to our revenues.

The market response to our new contract will also be critical in determining future investments in replacement capacity and in research and development. An important element of our long-range strategy is to replace the gaseous diffusion operations with technologies that are more energy-efficient and, ultimately, more cost-effective. As you know, we are currently building a Gas Centrifuge Enrichment Plant (GCEP) at Portsmouth, Ohio. Our current plan is to proceed in FY 1985 with construction of GCEP Buildings 1 and 2 and procurement of Set III centrifuges. No funds are committed to any buildings beyond Buildings 1 and 2 at this time.

Beyond GCEP, we are developing advanced gas centrifuge (Set V) and Atomic Vapor Laser Isotope Separation (AVLIS) technologies. In the near term, we plan to continue research and development on both. In FY 1985, we plan to select one of these advanced technologies for further development.

Revenues in FY 1985 are estimated to be $1.7 billion. Our request for budget authority is equal to the estimated revenues. Budget authority will be divided among diffusion operations, $1,171 million, Centrifuge, including GCEP, $422 million, and advanced technology, $78 million.

Mr. Chairman, the budget we are proposing is a prudent, balanced approach to meeting our responsibilities in the Department's several mission areas within the context of today's economic realities and tomorrow's anticipated needs. I welcome your questions.

SUMMARY OF 1985 BUDGET

Secretary HODEL. If I may just briefly summarize it, we have attempted to set forth in this budget strong support for the Department's responsibilities in three main mission areas. We have the energy portion, we have the general science portion, and we have the national defense portion of our budget. We have been working within the framework of the national energy policy plan we submitted to Congress in October. In that proposal we set forth a goal of an adequate supply of energy at reasonable costs for this country.

We have two main strategies within that goal. One is to minimize the Federal control and involvement in the energy markets, recognizing our responsibilities for health and safety and the environment. Second, not in terms of priorities but as a second primary strategy, we seek to promote a balanced and mixed energy system. By balanced and mixed we mean a total array of resources. We wish to avoid the pitfalls that have caused trouble for many of my predecessors, of being labeled as proconventional such as oil or gas or natural gas or coal or nuclear and anti everything else or prorenewables and conservation and anticonventional.

We think it is imperative as a nation that we maintain a balanced approach, and I hope that our budget has moved in the direction of increased balance.

I must recognize, Mr. Chairman, that there is no way within the budget constraints that we all face that I can satisfy all of the claimants for the various kinds of activities they think should be done. Each proponent of a particular category of resource would like to see all of the money in our budget funneled into the projects they feel are most imperative in their areas. We obviously can't do that. We believe that we have shifted our emphasis toward the more scientific and technical research aspects of these programs.

DEMONSTRATION PROJECTS

We have found through bitter experience that demonstration programs are very costly, very time consuming, usually controversial, and sometimes very difficult for us to complete. I think the classic instance in my experience has been the breeder and we are going through some of the same throes right now with the Great Plains coal gasification project. Each time we get the Government into the business of trying to pick a winner and expend the large sums of money to bring that winner home, we find that the efforts are sometimes met with great resistance and not particularly successful.

In the opening statement I have reviewed the current energy situation of the country to some extent and I will not belabor that point with you, Mr. Chairman. I know you are well aware of that situation.

BUDGET OVERVIEW

The budget for the DOE programs is $15.1 billion, which includes $1.9 billion in off-budget funds for Strategic Petroleum Reserve oil as well as acquisition and transportation funds. After we had made adjustments for prior-year funds applied to this budget, the new budget authority is requested at $14.9 billion with anticipated outlays of $13.8 billion.

We have, as I indicated earlier, made an effort in the area of conservation and renewables to improve the balance within this budget. In this area our proposals are quite close to the amounts of money that were appropriated by Congress in the last year. This is a great deal more than we requested last year. In this year's request it is still slightly below the amounts of money provided by Congress in the last budget. We have now a budget in which the nuclear energy portion is slightly more than $618 million, about half of which is for the basic breeder reactor program and the other half is for general nuclear.

In the basic sciences area we have about a $750 million proposal, in conservation and renewable energy just under $600 million, in fusion under $500 million, and fossil energy about $300 million, roughly the same as the nonbreeder portion of nuclear. As I say, there are great arguments, and I have heard a lot of them, as to whether that is the proper balance. It is a more balanced proposal than this committee has seen from the Department previously.

OVERCHARGE FUND

We have presented legislation, Mr. Chairman, to the Congress proposing that a fund be created from the overcharge money for which we cannot identify victims in the oil overcharge cases. That fund would be appropriated by the Congress for support of three programs in the energy field which have been funded by Congress in the last several years.

This funding would support the weatherization program which we have proposed for zero funding in past years, the low-income energy assistance program, and the hospitals and schools grants program. The funding for those programs has been set in the range of $2 billion by the Congress in the last several years and our proposals have been well below that in this administration.

If this piece of legislation were to pass, it would represent a 5-year administration commitment to fund those programs and at least adopt the levels which are presently supported by the Congress. Hopefully that would buy some time as opposed to this on-again-off-again process which has been, I am told, of some difficulty to the Congress.

STRATEGIC PETROLEUM RESERVE

The Strategic Petroleum Reserve fill rate which is proposed in this budget, Mr. Chairman, would be at 145,000 barrels per day, which roughly equates to 53 million barrels of oil added to the Reserve each year. This rate would give us, at the end of fiscal year 1985, 482 million barrels in the Strategic Petroleum Reserve, just under two-thirds of the way toward completing the planned fill of 750 million barrels.

GENERAL SCIENCE

In this budget, also, general science is up 16 percent which is the same percentage increase as last year. We propose preliminary research to be undertaken on the next generation particle accelerator, the super conducting super collider as it is sometimes called, also called the TEVATRON depending on who is talking about it. This is one of those projects I referenced in response to your comments earlier, Mr. Chairman. This is a project in which I think it is imperative that we do some of this preliminary work, scope it, do preliminary design, make an earnest effort to evaluate the cost of it and its benefits. Then we can determine whether we proceed with it, as distinguished from simply drifting into a program which has strong support from the scientific community but without having identified what the price tag will be.

URANIUM ENRICHMENT

Finally, Mr. Chairman, I should close by mentioning that we have the uranium enrichment enterprise which is carried on by this Department. It has been a $2 billion a year business. We have taken steps to see to it that we convert this program into a competitive enterprise. By that I mean, in my trips this last fall to Japan and Spain in particular, I found that we had not only the highest priced product in the commercial field but we also had the least flexible and most restricted contract. Our customers were preparing to leave us in droves, which would have left us with a very serious management problem of what we would do about the enriched uranium.

We have proposed a new contract and are receiving very favorable responses to it. By the end of September this year, we will have had an election by all of our customers as to whether they wish to continue to buy from us or not. We will know what our next 10 years of requirements will look like. I believe that will permit us to develop the best least-cost operating mode for this whole enriched uranium program that we have.

I am persuaded that the United States is well on the way to becoming once again the least-cost supplier of enriched uranium in the world and I think that is important, not only for what it means in terms of human benefits from low-cost energy, but it means a great deal in terms of our retaining our responsibilities with regard to nonproliferation. If the United States ceases to be a major factor in the world of the commercial nuclear industry, we cease to have significant restraints on the activities of other nations with regard to nuclear materials.

With that, Mr. Chairman, I think I should respond to your questions.

Chairman HATFIELD. Thank you, Mr. Secretary. You always present very succinct and eloquent testimony.

ATOMIC ENERGY DEFENSE PROGRAMS

Mr. Secretary, as you know, much of the public is unaware of the fact that there are three appropriations bills that relate to defense spending: the normal Defense Department appropriation bill, the military construction appropriation bill, and finally, the Department of Energy's nuclear weapons and atomic energy defense program in the Energy and Water bill.

Now, that portion of your budget from 1981 through 1984 has almost doubled, going from $3.5 billion to almost $7 billion in fiscal year 1984. And in this budget for fiscal year 1985 you are requesting a 22-percent increase in these weapons activities. Yet the total level of work reflected in the number of warheads built will not increase in fiscal year 1985.

How would you justify this large funding increase in weapons activities? And also, would you give us the inflation rate or the escalation rate that was used in developing the budget request for those activities?

Secretary HODEL. The last part of your question is the——

Chairman HATFIELD [continuing]. What did you compute in this request as the inflation rate or escalation rate? In other words, talking about real growth versus the inflation.

Secretary HODEL. I am told that the figure that is used for the inflation rate is about 5 percent, Mr. Chairman, so that would be the deflator. That would still leave substantial growth, which I think is the point you are raising.

Let me comment first of all on the general trend. The trend has been a response to the increased emphasis this administration has placed on military preparedness. Our activities with regard to nuclear weapons materials are driven by the annual stockpile memorandum which is signed by the President and prepared in conjunction with the Department of Defense. The President approves that document each year and it becomes essentially our "work order" over the next 5- and 10-year periods.

In order to meet those obligations we have substantially stepped up the activities. They fall into several categories. There is a long leadtime process to prepare to construct a facility in this program because of the tremendous care which is taken with nuclear material. As I know you are well aware, for instance with regard to the MX missile, we have had to begin, in advance of almost everyone else's activity, the design and planning work and site preparation if we are to meet the intended schedules, while recognizing that Congress may very well alter those schedules.

BUDGET PRIORITIES

We also have an aging plant. In last year's budget and again this year, we are attempting to upgrade and maintain those facilities with substantially increased expenditures. This is just plain maintenance which is the first thing to be deferred when you have a budget crunch. Actually, the first thing that is usually deferred is research. The second thing that is deferred is maintenance. Sometimes you switch the order, but that remains basically what happens. We have tried to catch up on some of that.

SAFEGUARDS AND SECURITY

We have also become increasingly concerned about safeguards and security departmentwide. We are spending significant sums, in this case, I believe in fiscal year 1985 we are proposing to spend about $130 million more than our fiscal year 1984 appropriation for improvements in safeguards and security in the operations of these facilities, recognizing that we do not want them to be vulnerable to terrorists or other disruptive activities.

ENVIRONMENTAL PROTECTION

Finally, we are attempting to upgrade the environmental relationship of these facilities to their surroundings. For a long time these were reservations which had a boundary that was not generally transgressed by people nor by outside rules. We are finding that we have to spend larger sums of money than we have spent in the past to clean up, not nuclear problems as much as just plain toxic materials, in order to be able to meet existing legislative requirements. I am sure it has come to your attention that it appears that sometime 10 or more years ago in excess of 2 million pounds of mercury was lost or spilled at the Oak Ridge facilities. When that came to light last spring the new manager went in and identified the various problems. We found that we had a very sizeable expenditure that had to be made there in order to bring the facilities up to a level acceptable to the community and to us.

Chairman HATFIELD. Mr. Secretary, I appreciate your concern. I share it on the matter of maintaining a good maintenance and safety or environmental activities. But really when you look at the increase in operating expenses for weapons production that is another part of this thing that I would like to urge you to take a hard look at the increase. I am more concerned with the operating expenses, especially in relation to the number of warheads built that should summon in my view—tell me if I am inaccurate. It seems to me when we have this kind of increase which with or without your inflator, the 22-percent increase, and yet a constant level of warheads built, it seems to me there ought to be some relationship between those two figures. Maybe you would like to provide it for the record.

Secretary HODEL. I think I should augment my comments for the record.

Chairman HATFIELD. All right.

Secretary HODEL. However, let me observe that we have seen in the last several years, I believe, a significant increase in the number of types of warheads and increased material requirements, which I would expect to be reflected in the Department's budget request documents. I will explain why there is not that correlation for the operating budgets.

[The information follows:]

WEAPONS PRODUCTION OPERATING FUND INCREASE

The requested increase for the total weapons program production and surveillance budget, including operating expenses, equipment, and construction, is over 22 percent. The requested increase in production and surveillance operating funds, after allowing for escalation is only 10.4 percent. The increase in workload for weapon builds adjusted for leadtime and complexity is 10.5 percent.

W82 WARHEAD

Chairman HATFIELD. Well, then you add to that another factor, this budget does not request the 155mm nuclear warheads.

Secretary HODEL. That is correct.

Chairman HATFIELD. The W-82.

Secretary HODEL. That is correct.

Chairman HATFIELD. So would this not reduce, to some extent then, the requirements in the future as it relates to plutonium and tritium and some of these exotic materials that are required for production?

Secretary HODEL. The advice I am given, Mr. Chairman, is that it would slightly reduce requirements. But the assumption is that by not replacing the W-48 warhead with the W-82 warhead we would still continue to have materials requirements for the W-48 15mm weapon which is presently in place. The W-2 warhead is to replace the W-48 15mm warhead. We don't have the new weapon; we will still have the old one, and the material in it will not be available for recycle to offset other material requirements.

Chairman HATFIELD. Of course you can't replace the old one, because the new one cannot be deployed in Europe.

Secretary HODEL. That is right, and, therefore, we have to continue to maintain the old one and thus not free up materials for recycle to other weapon systems.

Chairman HATFIELD. I would like to return to this general subject.

Senator Abdnor, Senator Domenici is chairing a hearing which he has left momentarily. Would it be satisfactory to defer to him and let him ask some questions and then we will get back to you?

Senator ABDNOR. Yes.

Senator DOMENICI. Thank you so much.

I have two questions, Mr. Chairman, and I am most appreciative. I would not do this, but Secretary Bell is up there waiting also and I thought I would do this quickly.

Chairman HATFIELD. This is Cabinet day on the Hill. I just came from a hearing with Secretary Shultz.

Senator DOMENICI. Security guards all over the Hill.

Do you have security?

Secretary HODEL. Not me, Senator. Nobody knows who I am. [Laughter.]

Senator DOMENICI. Nobody wants your job. [Laughter.]

MAGNETIC FUSION PROGRAM

Well, this might be as much a statement as it is a question, but maybe you would have a sentence or two in rebuttal. This is a small problem, but in the 1984 appropriation the Department requested funds to begin the upgrade of a fusion machine at the Los Alamos Scientific Lab. In its approval of that request, including the upgrade of this ZTH machine, it added funds for problems closely related to the machines. We added a million dollars for the study of the effect of plasmas on the walls of that and $3.5 million for the compact toroids. Now my concern relates to how those funds have been spent since they have been appropriated.

For example, of the $1 million in your request for the design of ZTH, only $400,000 has reached the lab and that has been retargeted for operating the present machines. Supposedly the balance of those moneys are on the way but they have not been received even though we are almost halfway through the year of a million for the first wall research that neither of the labs have received funds as of this time. My staff checked as late as last night speaking to people in the programs.

The area of $3.5 million add-on for the compact toroids in the Department continued this approach, first withdrawing $750,000 from the budget and then announcing that some of the funds appropriated were to be delivered and those delivered to the tune of $750,000, but not $3.5 million, and no net gain in funding even though the bill that we approved seemed rather clear.

Now we are not talking, as I understand this, from my involvement with the project that has no merit, speaking about scientific or technical merits, because their own advisory board has not been supportive, yet it seems to me that the staff in the Department seems intent on frustrating the process related to this project. As I said, maybe that is not a question, maybe that is just saying to you I don't think that is the way to do business; maybe you ought to look at it.

Secretary HODEL. Senator, if I may start a response which I think I will have to follow up for the record, because you and your staff have made very plain your concern about this; I was briefed, I thought, thoroughly on this matter. The advice that I received is that the $1 million which was for fusion systems engineering, particularly on the first wall systems, has been released to Sandia National Laboratory and that, in fact, $1,250,000 has been made available to them. This is obviously a very serious disconnect on information which I simply will have to pursue. I will find out why the laboratory is supplying you with one set of information and why I am being supplied a different set of information. My advice in anticipation of the hearing was that we are all right on that, but I think we need to find out what happened.

Second, on the funding for the magnetic fusion program, both the reversed——

Senator DOMENICI. That was my next one.

Secretary HODEL. I know your concern. My understanding is that we have released all of the money at the approved level for the reversed field pinch and in the case of compact toroids about, as I recall it, an $11 million activity. All together, the Los Alamos share of the compact toroid funding was to have been $5.8 million. My information is that we have made available $5.1 million. We have taken $700,000 from the total for use in alternate fusion fuel research, mainly for the maintenance of university contract services in this area. About $200,000 of the $700,000 is being spent through Los Alamos National Lab, although the other $500,000 would not be. So what concerns me is that clearly the information you are being given indicates what I am told has not happened. I think I can't go further than what I have but I do need to follow up and get a satisfactory answer to you and to me as well.

Senator DOMENICI. I think that is right, Mr. Secretary, but also I would hope that in the process if there have been departmental reasons justifying the delays, that is one thing; if it is just that somebody down there in the Department does not think this is the way it ought to be done, we have that problem all the time. You are supposed to do that, that is why we are up here I guess and people will decide.

Secretary HODEL. Senator, as you know, it is my personal desire to see to it that we properly and responsibly expend the funds that you in the Congress are providing DOE. That is one of the matters I took to heart from the time I entered this job and it would be very troubling to me to find that without adequately recognizing the concerns of the Congress we were distributing the funds differently. Now I will pursue this and advise you.

Senator DOMENICI. I appreciate that.

I have one other question on the fusion; I will give it to you and you can answer it for the record. I don't want to impose on the committee.

Thank you very much.

Secretary HODEL. Thank you.

Senator DOMENICI. Thank you, Mr. Chairman.

[The question and answer follow:]

MAGNETIC FUSION ENERGY

Question. Mr. Secretary, on the broader topic of fusion, the Department is in the process of coming to a decision on whether to proceed with the next large experiment, that is whether or not you will build a machine that will actually burn tritium fuel for fairly long periods of time. Obviously, building such a machine will cost a great deal of money and, as I understand it, the Department is considering doing this within the existing budget. Now Mr. Secretary, if a commitment is made to that machine, clearly a number of other areas within the program are going to have to be sacrificed. My guess is we will have to sacrifice the research on Mirror machines and research in the area most commonly called advanced concepts. My question really is, Mr. Secretary, does it make sense to sacrifice those areas, like advanced concepts, where we are looking for fusion machines that will make practical power reactors in the future? In focusing all of our efforts into this next physics experiment do we lock ourselves into that machine which we use to do the physics experiment, that is a large Tokamak reactor? It has not been my experience that utilities are overjoyed at the thought of a very large capital intensive machine such as the Tokamak. Aren't we making the same mistake we have made before of locking ourselves into a technology which utilities will not want to buy?

Answer. It is too early in the planning process for a possible ignition experiment for me to be able to give a comprehensive answer to your question. However, both the Energy Research Advisory Board (ERAB) and the Magnetic Fusion Advisory Committee (MFAC) hae stated that the two key objectives of the fusion program should be to investigate reactor core conditions in an ignited, long-pulse experiment and to develop an economically attractive fusion reactor concept. The pace of achieving these two objectives would depend on available funding. Therefore, planning for a possible ignition experiment includes careful attention to cost and consideration of international collaboration to ensure that both objectives can be effectively pursued.

I share your belief that capital cost is one of the significant factors in the attractiveness of a fusion reactor. While conventional Tokamak reactor plant designs have been capital intensive and comparable in size to existing nuclear plants, advanced Tokamaks show promise of reduced reactor size, and experiments are underway to test some of these ideas. For example, in the Princeton Beta Experiment (PBX) at Princeton Plasma Physics Laboratory and the Advanced Toroidal Facility (ATF) at Oak Ridge National Laboratory, plasma shaping and special fields are expected to allow higher power density operation. Other toroidal concepts are being developed with the possibility of further substantial size reductions, such as compact toroids and Reversed Field Pinches (RFP's). The United States leads the world in compact toroid research and participates in RFP development, which is being advanced by a next-step device now under construction in Italy. The MFAC has been asked to assess these supporting concepts to identify areas where increased emphasis would result in better understanding of fusion physics. In addition, the potentially simpler linear concept, epitomized by the tandem mirror, is being strongly supported.

However, all of these other concepts are at a much earlier stage of development and could not be considered for a near-term ignition experiment. To date, we have achieved plasma conditions in the Tokamak equal to those required for thermonuclear breakeven, which we expect to demonstrate using the reactor fuels deuterium and tritium in the Tokamak Fusion Test Reactor (TFTR) in 1986. The Tokamak is the only concept advanced to the point of readiness for an ignition experiment. The physics and technology data to be gathered from studying the reactor core, combined with results from further development of advanced concepts, including the Tokamak itself, will provide the basis for development of economically attractive fusion reactors.

In a program as complex as the magnetic fusion program, the balance between major objectives and competing approaches requires frequent reassessment based on technical results. The Department is responsible for maintaining this balance, and does so with advice from MFAC and periodic reviews by ERAB.

GREGORY COUNTY PUMPED STORAGE HYDROELECTRIC PROJECT, SOUTH DAKOTA

Senator ABDNOR [presiding]. Mr. Secretary, it is good to be with you today. I only have one or two questions.

I am going to also submit one question in writing because I am sure you are not familiar with the question I am talking about. It deals with a Gregory County hydropower project. I am going to leave the question with you and you can give me an answer at a later time, not so much for the record but maybe for the record, too, if you wish.

[The question and answer follow:]

QUESTION SUBMITTED BY SENATOR JAMES ABDNOR

GREGORY COUNTY HYDROELECTRIC POWER PROJECT

Question. The Corps of Engineers has been studying a large-scale potential pumped-storage hydroelectric power project in South Dakota. It's called the Gregory County project, and the State has been trying to organize the necessary group of utilities to participate in the kind of partnership financing arrangements sought by the President.

As you know, there are institutional problems in working out these kinds of arrangements, but do you believe these difficulties can be worked out? More specifically, do you believe it is possible to allow construction cost-sharing contributions from investor-owned utilities on a basis which is fair to them, but which does not adversely affect the traditional rights of the preference power customers?

Answer. A proposed pumped-storage hydroelectric power facility to be located in Gregory County, S. Dak., is authorized in S. 1739, which has been favorably reported by the Committee on Environment and Public Works. The issues raised by this question are contained in a letter to me from Senator Abdnor dated February 13, 1984. My staff is reviewing these issues and others raised in that letter, including the subject of regional preference. I expect to be in a position to provide a comprehensive response for Senator Abdnor in the near future.

EDGEMONT, S. DAK.

OFFSITE REMEDIAL ACTION PROJECT

Senator ABDNOR. All of us have our parochial questions and problems and I am going to ask you about one of mine; I think you are familiar with this. We have included in our last few reports language on this matter. This subcommittee has accorded the offsite remedial action project at Edgemont, S. Dak., a high priority. Are you familiar with that?

Secretary HODEL. Yes.

Senator ABDNOR. Again, the committee gave this project a high priority. We did, in fact, direct you to complete the offsite work during the current fiscal year. I understand, however, that you have other obligations which may prevent your Department from proceeding as swiftly as we might hope. I am advised that the Edgemont offsite project is well underway and that you have every intention of complying with our directive to the extent your resources will allow. Are you confident that the amount you are requesting in your fiscal year 1985 budget will permit you to move ahead quickly with remedial action at this and other sites covered under the Uranium Mill Tailings Radiation and Control Act of 1978?

Secretary HODEL. Yes, sir. We have, as you know, a very extensive program on the uranium mill tailings sites and also the formerly utilized sites. Those two programs have attracted a great deal of our attention. We have a priority listing of the various sites, identifying those which need the most urgent attention. We have also had some assistance in the Congress and we have tried to do as responsible a job as we can.

SUBMITTED QUESTIONS

Senator ABDNOR. Why don't I leave this for you in writing, too, because I only have a minute and every one of us has projects. I will give both of these questions to you. Please provide the subcommittee with a complete response for the record.

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR JAMES ABDNOR

REMEDIAL ACTION SITE WORK

Question: Mr. Secretary, as you know, this subcommittee has accorded the offsite remedial action project at Edgemont, S. Dak., high priority. We did, in fact, direct you to complete the offsite work during the current fiscal year.

While I understand that other obligations may prevent your Department from proceeding as swiftly as we might have hoped, I am advised that this project is well underway and that you have every intention of complying with our directive to the extent your resources will allow.

Are you confident that your fiscal year 1985 budget request will permit you to move ahead quickly with necessary remedial action at this and other sites covered under the Uranium Mill Tailings Radiation and Control Act of 1978?

Answer. The Department's fiscal year 1985 budget request will permit us to move ahead with this project on a schedule that is consistent with project completion within the 7-year period authorized by the Uranium Mill Tailings Radiation Control Act of 1978; that is, by March 1990. In order to optimize the budget profile for the project, it was necessary to defer work on some of the sites from the schedules shown in our initial site master plan. Under the current master plan for fiscal year 1985, we will complete the site work at Canonsburg, Pa., and have work underway at Salt Lake City, Utah; Shiprock, N. Mex.; and Durango, Colo. The cleanup of vicinity properties will also be underway at several sites, including Edgemont, S. Dak.

Question. Mr. Secretary, would you please provide me with a written account of your Department's activities and expenditures at Edgemont to date, together with your forecast for fiscal year 1985?

Answer. The Department's actual and projected expenditures at Edgemont through fiscal year 1985 are listed in the table provided for the record.

Edgemont expenditures

[In whole dollars]

Fiscal year	*Expenditures*
1983	$13,400
1984 (through June 30, 1984)	25,100
1984 (balance of year)	974,900
1985	1,106,000

To date, we have obtained 46 owner-access permits. Engineering design is underway on 22 properties. By the end of fiscal year 1984 we will complete the engineering for 49 properties and the remedial action on 21 properties. During fiscal year 1985 we will complete the engineering on 18 more properties and remedial action at an additional 21 properties. Cooperative agreements with the State of South Dakota and the Tennessee Valley Authority, under which the work at Edgemont will be conducted, are being negotiated and execution of these agreements is expected in the near future.

STRAIT OF HORMUZ

Senator ABDNOR. We have been hearing a lot about the Strait of Hormuz and what would happen if that was closed. Are you following that situation over there?

Secretary HODEL. Closely.

Senator ABDNOR. I suppose you are. How much oil heading for the United States passes through that area? Quite a substantial amount?

Secretary HODEL. To the United States?

Senator ABDNOR. Yes.

Secretary HODEL. Less than 500,000 barrels a day passes through the Strait to the United States.

Senator ABDNOR. How much goes to Europe and Japan?

Secretary HODEL. The remainder of the shipments out of the gulf total around 10 million barrels today, and those 10 million barrels are spread all around the world. Japan is nearly 55-percent dependent; Western Europe, our allies, ranges from 20 to 40 percent, on average about 25-percent dependent; and, of course, many less-developed countries are heavily dependent upon it. There are about 44 million barrels of oil being consumed in the world today, so I usually say about 20 percent. It is actually more than that.

Senator ABDNOR. We get only 500,000?

Secretary HODEL. Actually, it has been less than that last year, yes.

Senator ABDNOR. What would happen if we got a restriction? Suppose Europe and Japan would come to us, would we help fill their needs? Would that situation probably arise?

Secretary HODEL. We have spent a considerable amount of time since late July when the first word came out that the French were going to supply the Iraqis with Super Etendard aircraft. With the utilization of Exocet missiles they had the ability to cover virtually all the Persian Gulf, and they said when they got those aircraft they were going to use them on Iranian shipping. The first date that I recall was August 17, the delivery date, and they have used them since that time. Since then, we have pursued the matter closely and have attempted to upgrade our response capabilities.

What we would do is determined by our International Energy Agency (IEA) obligations. If there is an interruption of, say, 12 percent or more, the IEA can trigger the responsibility of each of the member nations to reduce its consumption and imports by proportionate shares of the interruption in supplies. If each of the nations does that, obviously there is no shortage. If the nations fail to do that, then there is an obligation to share from those nations which have not reduced their consumption and imports to the acceptable level.

Senator ABDNOR. We bring in the 12 percent of our share, I mean we would be expected to reduce our consumption at 12 percent, we are bringing that in already from outside of the United States.

Secretary HODEL. Our net imports are close to 28 percent of consumption.

Senator ABDNOR. So, we could hardly be expected to give up some of our domestic oil then, could we?

INTERRUPTION OF OIL SUPPLY

Secretary HODEL. We would not be expected to give up our domestic oil which is about 10 million barrels a day, including natural gas liquids. The issue would be how much of our imports could we reduce. And other nations also have reserves—some strategic reserves, some nonstrategic reserves, some commercial reserves—and the application of those reserves, plus our reserves, plus the reduced consumption commitments of the countries would be the base from which we then say, "Where do we go from here?" We have played out several scenarios.

Interestingly, if the interruption of supply was for a short time, or if the interruption of supply was under 4 million barrels a day, there is a pretty good chance that the 4 million barrels a day can be supplied from outside the gulf. There is excess production capacity outside the gulf. Over 4 million barrels a day will get into that gray area, and if it goes above 5 million, there is very little chance of replacing anything above that which is lost. There would be 1 million or 2 million barrels a day lost. The strategic reserves of the world are sufficient to buy us some time.

Then we get into the question of how long can you keep the Strait of Hormuz blocked. When I was visiting the Gulf States they did not think it possible to block the strait for an extended period of time. Whether that is right or not is a matter of opinion, and I have picked up different views from other people.

Senator ABDNOR. I suppose with the policy that we have, we can go for several months.

Secretary HODEL. Yes, and the sustainable drawdown capability of the U.S. Strategic Reserve at the present time is a maximum of 1.7 million barrels per day, which is nearly 40 percent of net oil imports to the United States in 1983. Less than 40 percent of our imports come through the gulf. All of this sounds, I think, very calming on the one hand. The thing that I would have to say to counterbalance the calm is that this is a world oil market, and if we were not importing any oil at all and if Japan and Western Europe found themselves cut off from oil supply, considering their relationship to us both as allies and trading partners, it would have a very serious impact on us even if we were not importing any oil. I must have a balance there. In fact, I think we are fairly well equipped to deal with short-term, not too large, interruptions. At the same time, we cannot turn our backs on our allies.

OIL PIPELINES

Senator ABDNOR. Is there any way to get oil out of Iraq? Do they have a pipeline that is running down to Turkey?

Secretary HODEL. They have a couple of pipelines that run north, one through Turkey and one through Lebanon. And they have been proposing building a pipeline down into Saudi Arabia connecting with the cross-Saudi Arabian pipeline, which would give them access to the port on the west side of Saudi Arabia. That is a 1- to 1½-year project, and apparently there is some real thought of going forward with it. The pipeline through Turkey has suffered some operational problems recently which has reduced its exports and this has put severe economic pressure on Iraq.

Senator ABDNOR. Well, it is a volatile area of the world.

Secretary HODEL. Yes, it is.

Senator ABDNOR. This is going to involve the United States and other countries. I can't imagine this country sitting idly by with Japan and Europe getting as much as they get, particularly Japan. I don't think we are going to sit by and let it happen, I don't know. I hope it is something you are paying close attention to.

Secretary HODEL. Mr. Chairman, if I could just comment on the Senator's question just one further point. I think it is important that we try to continue to alert the American citizens to the fact that we are heavily dependent on imported oil. Whether we import or not, we are heavily dependent upon other nations, and it is highly desirable for this nation to continue to find ways to reduce its dependence on imported oil. Therefore it is one of the reasons we have continued to try to improve our emphasis on this dependency by admitting that it is not as high as some would like. We need to keep the pressure on and the emphasis on so that our citizens do not become complacent over current prices and supplies, which, in the long run, is not in the best interest of this country and causes our increasing dependence upon imported oil.

Senator ABDNOR. Sometimes that happens.

I better not monopolize all the time. Maybe I can ask one more question.

Chairman HATFIELD. Yes, take your time.

SYNTHETIC FUELS CORPORATION

Senator ABDNOR. It makes me think of the Synfuel Corporation and I think this is an extremely important thing if it is properly operated, that we ought to be continuing some degree in the event we have to go to this. We know we have plenty of renewable resources to make energy. It is expensive, but it could be done under extreme emergencies. How do you think this whole thing is operated? You must take a look at it even though you are not directly involved. Are we getting our money out of what we are doing or are we doing enough with the whole Synfuel picture?

Secretary HODEL. In fairness to the Synfuel Corporation I think it is imperative to take a look at the assumption that exists. When the Synthetic Fuels Corporation was created, the assumption was that we were running out of natural gas and oil very rapidly and that the world oil price was going to increase on a straight line. At that time, we were looking at $50 and $100 a barrel oil down the road. This would make synthetic fuels from oil, shale, or coal a very desirable project, and the large sums of money we are talking about at the Synthetic Fuels Corporation could generate increased activity.

Obviously, that situation has turned around at least in the short term. We have now nearly 8 million barrels excess oil production capacity in the world. We think we have larger supplies of natural gas in this country and adjacent countries than we had, and so we find ourselves in a situation where the price of oil has not only come down from $34 to $29 per barrel, but a number of companies are anticipating there will be softening in that price still because of the excess production capacity.

In that circumstance, a system which calls for the construction of plants which will produce synthetic oil at $50 or $60 or $70 a barrel or more does not look very competitive and it is not. Price guarantees which we thought would be subsumed by price rises suddenly become payable by the Government, and although we expected millions of barrels of oil to be produced from synthetic fuels we will, in fact, have a few tens of thousands of barrels a day.

GREAT PLAINS COAL GASIFICATION PROJECT

My belief is having gone this far into some of these projects we ought to complete them. I hate not to see the Great Plains coal gasification project completed, for example. The first line comes on in June, and it is on schedule. It seems a shame to me to let that project falter and not learn what we can from the completion of it. Hopefully, the Synthetic Fuels Corporation and Great Plains Gasification Association can work this out. With so many other synthetic fuels processes, even with the guarantees that have been provided it does not look like they are economically feasible. In the end the economics will dictate.

Senator ABDNOR. I do not believe that we ought to completely overlook this whole area because the day is going to come, I don't know when, when it may be very necessary that we have this investment. So far it would seem foolhardy to walk away from it without following through until we are satisfied in our minds that in the event a situation arises, that we could do something about it. I just hope we at least make that position before we get carried away.

Thank you.

ARAB OIL EMBARGO

Chairman HATFIELD. Mr. Secretary, let's go back to the program a moment, but let me get before us here for the context of my question some review of trend lines. First of all, the trend line on Middle Eastern oil since the Arab embargo has been generally dominant.

Secretary HODEL. The boycott in 1973 was followed by continued increases in imports of oil to repeat the 1977 or 1978 experience, at which time it was about or just over 8 million barrels a day. This time it has come down to last year, when it was about 4 million barrels a day.

Chairman HATFIELD. So it dropped to about what, from 33 percent down to about 28?

Secretary HODEL. If I recall the percentages, it was like 42 percent.

Chairman HATFIELD. So the trend line has been down?

Secretary HODEL. Net is down to 27. I say "net" because the trend line is turning.

Chairman HATFIELD. Now we are seeing that trend line level off and it has come up. I believe the figure I saw was with respect to increase in consumption some 3 to 5 percent; is that correct?

Secretary HODEL. That would be probably our overall oil consumption, and the biggest share of that will be from imports. We are projecting that net imports will range from 5.0 to 5.5 million barrels this year, which would be about a 20- to 30- percent increase, excluding the Strategic Petroleum Reserve.

SOLAR AND RENEWABLE ENERGY PROGRAM

Chairman HATFIELD. All right. Another trend line, as I indicated earlier, was the doubling of the budget for military weapon systems in the last 3 years. Now tell me in the solar and renewable area of the budget, what has been that trend line in the last 3 years?

Secretary HODEL. The trend line of appropriations has been down. The trend line of our requests compared to appropriations has been even lower. The trend line I like to look at, Mr. Chairman, is the trend line of our requests. Our requests have risen sharply.

Chairman HATFIELD. In 1985?

Secretary HODEL. And up somewhat in 1984 over 1983.

Chairman HATFIELD. But more significantly from 1984 to 1985?

Secretary HODEL. A big change in 1985.

Chairman HATFIELD. And I want to congratulate you on that. You have at least got a tourniquet on the hemorrhaging that we have experienced, have you not?

Secretary HODEL. Mr. Chairman, I may be slow, but I do learn.

Chairman HATFIELD. In fact, I believe that if we want to put it in terms of dollars, the solar and other renewable programs have dropped from about $600 million down to approximately $200 million in this 3-year period.

Secretary HODEL. That sounds correct, Mr. Chairman.

CONSERVATION PROGRAMS

Chairman HATFIELD. I think that is fairly accurate. I believe that when you extrapolate from the budget trend line on conservation activities that that figure is around a 70-percent drop in the last 3 years.

Secretary HODEL. From what?

Chairman HATFIELD. Does that sound like a ball park figure to you?

Secretary HODEL. That sounds like a ball park figure.

Chairman HATFIELD. I think that is fairly accurate.

Now, what I am really driving at is simply this. If we found ourselves in a crisis—a greater crisis, we are already in a crisis—but if it should escalate and threaten the oil supply one way or another, would it not be true that it would be something far beyond just the United States? As you indicated in your response to Senator Abdnor, don't we have commitments to share a reduction of oil supply with our friends in Western Europe and Japan? So whatever we have done in terms of minimizing the impact of that for ourselves at least from a temporary holding basis, it might not necessarily apply to our Western European friends and Japan.

NATIONAL SECURITY IMPLICATIONS

Now with that premise it seems to me that we have to begin to look at the energy problem more in the context of our national security. You indicated this administration has been escalating this weapons part of the budget because of its commitment to national security.

Now my question is this, Mr. Secretary: When you sit in the councils of the White House as the Secretary of Energy and when you are in conferences with the Secretary of Defense, the Secretary of State, and others who are charged directly with the programs of national security, do you raise the point that energy is as fundamental to our national security as nerve gas or the 155mm nuclear warhead or whatever other weapons of war this administration seems so intent on trying to acquire and put in the arsenal? At the same time, these trend lines in terms of our dependency on imported energy are unsettled, programs that would help us ensure energy independence have been on a downward slope and all the military weapons have been on an upward slope. Now obviously this administration has not understood that the energy independence is fundamental to our national security. What I am asking is, are you carrying that thesis in the councils of the Reagan administration?

Secretary HODEL. Mr. Chairman, I have been heard to do so. I have to qualify that by saying I don't raise it every time the issue comes up, but I have supported strongly the extension of energy tax credits for renewables and conservation. That is not an easy peace to make when we have deficits the size we have. But I think we have made some progress. I have no problem with this administration recognizing the importance of energy from the President to all of his advisors, to the key members of the Cabinet you have mentioned.

There is a clear recognition of the urgency of energy. In any activity we undertake there is a genuine disagreement, obviously, on how best to spend the dollars we are able to on energy projects ranging from breeder reactors to coal gasification projects to synthetic fuels. If this Nation has a problem, it has been so blessed with resources that the proponents of one resource say, "Forget all those others; you can use this one to the exclusion of all the others."

We believe that we have not turned our back, particularly with the increased funding that we are proposing, and we have not turned our back on responsible directions toward solar, wind, geothermal activities which may make a contribution in due course. They are not economically competitive today. One of the arguments suggests that if we would just turn some of that money over to people who are drilling for oil, we would be better off. My argument is we do recognize oil to be a depleting resource. There is an incentive to go from oil to gas.

ENERGY TAX CREDITS

We do need to push some of these other processes, including energy tax credits, in my estimation from an energy standpoint. I don't have the overall budget responsibility as you know and I can't say in the end that is the best spending of that money; but, yes, I have carried it and I think there is a recognition. I think we are on a responsible course. This Department, in a prior budget proposal, requested $7 or $8 million on a demonstration for solar. That was done and it was such a good project that the utility district liked it, the contractor liked it, the Congressmen liked it, and we put in the second one from which we learned nothing and didn't expand the technology in the society, at least in our view. There are arguments on that but it seems to me that we have got to try.

I see this as kind of a wall of resistance in each of these areas—problems, technology, economic, resource base. We need to try to push that wall in where the private sector will move. The most encouraging thing was when Sears decided to put in a solar hot water heating system into its stores to sell it. When the commercial giants reach the point they believe they can sell renewable resources to consumers that will do a thousand times what any Government program can do.

By the time we pay the bureaucracy to distribute the money, much of it does not reach its end purpose, or so we believe, so I am encouraged by that. I think that is where we can make our greatest contribution—do research, reduce costs, and get the private sector and the individuals to start buying it. That is why I do say we must keep the pressure on, the momentum on the conservation renewals.

Chairman HATFIELD. I couldn't agree with you more in some of your theses. The only problem that I have is that I think like many other things where this administration has attempted to shift the emphasis to the private sector—and I agree the private sector is demonstrably more effective and more efficient, more economic—I think though the administration has failed to recognize that there is a transition that has to occur. This idea of chopping off one program that is primarily sponsored by Government and then expecting the private sector to pick it up immediately is unrealistic. I think the way this administration has approached some of those efforts, to shift the emphasis to the private sector, has been devastating—abrupt change rather than moving through a transition period and letting the tax credits or other incentives that have been created to take hold, let it pick up the slack, and then phase out the cover or phasedown or whatever the case may be.

I really feel that if it had not been for the congressional pressure we would probably have seen a lot of these programs excised. It was like the approach to education; you solved the problem of education by abolishing the Department of Education. Well, I am not sure that it is a reasonable solution and Congress said, "Well, that is not so, therefore, we are not going to abolish the Department of Education." Now, they wanted to abolish the Department of Energy as well. Like a few years ago we were going to solve the problem of bums on welfare by just totally abolishing welfare. I am not sure that that is a very practical approach to some of these important issues.

I think that we have to move in a very pragmatic, practical way on these things, and I want to commend you again for reversing this trend or, as I said, putting the tourniquet on the hemorrhaging of these programs and probably to the total abolition of some of these programs this is probably in the thinking of those who were administering this meat ax approach to the problem before you took on this responsibility. I sleep better at night and I started sleeping better immediately after you took over this agency, Mr. Hodel, because I know you would be a reasonable man and a man with a long-time commitment to conservation to get ourselves off this dependency of Middle Eastern oil through developing the renewable resources. So be it.

HANFORD WASTE DISPOSAL SITE EVALUATION

Let me shift gears now. I think I made another point. The Hanford Reservation in Washington State has been considered as a potential site for radioactive waste materials. The DOE site evaluation report, I believe, was very upbeat about its suitability, but the U.S. Geological Survey and the NRC were precisely the opposite, they were very critical about the report's findings. In fact, the USGS used words like "overstated," "misleading," or simply "incorrect" in describing the findings of the report.

Can you give me an update on this issue as it relates to Hanford?

Secretary HODEL. Yes, sir, Mr. Chairman. We must be in an extended public process before we can make a selection and that is precisely why we are in that kind of process. If I have an upbeat report which may not include all the facts that the other included, we have a chance to see all of those before we even narrow down to the three sites which are recommended to the President and which then will be subjected to intense public and scientific scrutiny. My understanding is that we are pursuing all nine sites at the present time in six States. We are attempting to keep them on essentially a fairly equal knowledge base.

WASTE DEPOSITORY SITES

The target date in the statute for the first waste depository is 1998. There is some concern that because of the requirement for the extended environmental review it will take longer than that to get the job done and, in any event, at this point I should say we have not foreclosed any of those sites. We have not foreclosed the Hanford site. The conclusions will be covered with the same stringency by the Department of Energy.

In the end I suspect we will find a great concern about each site and that we will have the good thinking statements about each site which will ultimately have to be weighed with what the statute says and by the President.

Chairman HATFIELD. Thank you very much.

I yield to the Senator from North Dakota and I will turn the gavel over to the Senator from Louisiana and go to the floor on the matter of exporting oil to Japan from Alaska.

Secretary HODEL. I am glad you didn't ask me about that, Mr. Chairman.

Chairman HATFIELD. I was being gentle today. [Laughter.]

Secretary HODEL. Thank you.

NORTH DAKOTA ENERGY RESEARCH CENTER

Senator BURDICK. I just have one question, Mr. Secretary.

Last April, the Department of Energy and the University of North Dakota signed a cooperative agreement to manage the Energy Research Center at the University of North Dakota. I understand, however, that DOE continues to carry on research activities at the center relating to low-ranked coals. Can you explain what these activities are and what is the budgetary impact?

Secretary HODEL. Senator, I am sorry, I don't know the details of that program. I would be happy to supply that for you and for the record. I am aware of the transfer that we continue to provide support for various programs, but I don't know the details.

Senator BURDICK. If you would supply the information, we would appreciate it.

Secretary HODEL. Thank you.

[The information follows:]

LOW-RANK COAL RESEARCH PROGRAM—GRAND FORKS PROJECT OFFICE

The Grand Forks project office was established in 1983 to administer the cooperative agreement between the Department of Energy's Office of Fossil Energy and the University of North Dakota Energy Research Center. The fiscal year 1984 cooperative agreement funding is $7,785,000 and additional supporting procurement funding is $1,335,000. While the fiscal year 1985 cooperative agreement funding is set at $7,411,000, the level of procurement funding for those efforts, in addition to the cooperative agreement, is currently under negotiation.

The research areas that have been historically supported, and which will continue to be supported by the Department through the Grand Forks project office and the University of North Dakota Energy Research Center, include surface gasification, combustion, liquefaction, advanced research and technology development, and control technology and coal preparation. Examples of particular research activities are: development of new flue gas and hot gas cleaning concepts; development of new concepts for technical innovation in waste management; performance of background studies of coal combustion reaction mechanisms and rates; development of catalysts and improved distillate yields in coal liquefaction; and development of gasification process improvements.

Senator BURDICK. I understand, however, that DOE continues to fund certain research activities related to lower ranked coal as I said. In addition, I understand that the center is also working with the Great Plains coal gasification project. I am pleased that these two DOE-related projects, both located in North Dakota, are working together. Can you explain to the subcommittee how the federally funded research at the center relates to coal gasification projects?

Secretary HODEL. I can give a generic description which is that the Synfuel Corporation does not do research on synthetic fuels; the Department of Energy does that kind of research. We have a number of programs in synthetic fuels. I am assuming from the question that the work funded by us there relates to the gasification of coal and would be supportive of Great Plains. Again, the details I will have to supply to you for the record.

Chairman HATFIELD. Very fine. Thank you.

[The information follows:]

LOW-RANK COAL PROGRAM—STUDIES IN SUPPORT OF SURFACE COAL GASIFICATION

Low-rank coals represent a major and largely untapped resource in the United States. These low-rank coals have significantly different chemical and physical properties from those associated with higher rank coals and, therefore, present advantages and disadvantages when considered as feedstocks for gasification processes. The actual impact of these unique properties on the performance (economic and technical) of a coal gasifier and gasification process cannot be predicted with sufficient accuracy to verify the application of existing design or performance capabilities for gasification facilities that would use low-rank coal as a feedstock.

The characteristics of the particular low-rank coal must be evaluated under the process conditions of the intended application to determine key design parameters, to select appropriate cleanup technologies, and to minimize any associated environmental impact resulting from the use as a feedstock for coal gasification facilities.

The major driving forces for the experimental gasification program on low-rank coal include environmental concerns about liquid effluents and solid wastes, operability of the gasifier system, gasification efficiency, and correlation of operational data obtained from the Great Plains gasification facility with the experimental data base generated from earlier PDU and pilot plant operations.

The program directed at developing environmental data on the characteristics of effluents is needed to minimize the environmental impact of these processes. Specifically, efforts will be directed toward validating the adequacy of various combinations of physical, chemical, and biological wastewater treatment methods; characterizing slag and waste treatment sludges and their leachates to ensure safe disposal under RCRA guidelines; and to assess occupational health issues.

In addition to the work being performed on environmental considerations, studies on ash and slag characterization are underway. Specifically, the thermophysical properties of slag including viscosity, surface tension, thermal conductivity, et cetera, under reducing conditions are being determined; reactions occurring during slag attack on refractories will be characterized; and an attempt to develop a fundamental understanding of the changes occurring during the ashing of low-rank coals will be made.

During fiscal year 1985, these studies will be continued and particular attention will be directed toward the shakedown and operation of a skid-mounted PDU liquid effluent cleanup system. Efforts will be directed at correlating the data from these studies and using it to evaluate, support, and/or resolve problems associated with operation of the Great Plains gasification plant.

MAGNETIC FUSION PROGRAM

Chairman HATFIELD. Mr. Johnston.

Senator JOHNSTON [presiding]. Thank you very much.

Mr. Secretary, welcome to the committee again.

Secretary HODEL. Thank you.

Senator JOHNSTON. Mr. Secretary, I am becoming increasingly concerned as the budgets get tighter about some of our energy programs which I have more or less totally and unquestionably supported in the past. One of those programs is magnetic fusion. The request is $483 million, up from $458 million in 1983 and $471 million in 1984. When you really look at our fusion programs, both magnetic and inertial confinement, I think anyone has got to come to the conclusion that the hope of getting unlimited energy at no cost and forever in all those things is really a vain hope. What we basically have in the fusion program, in my judgment, is sort of a basic science research program with the hope of getting a breeder, probably a breeder inferior to the sodium breeder, fission breeder, if it ever works. Can you dissuade me of that judgment?

Secretary HODEL. Without being too flip, Senator, probably not. I would like to make a couple of comments if I may. I happen to have with me today my Director of Energy Research. He is also my chief science adviser and very well acquainted with the fusion program. Subject to your approval, I would like to defer to him on some of the details.

Senator JOHNSTON. Yes, I very much would like to hear from him.

Secretary HODEL. Let me place it in the context as I see it, not as a fusion scientist. The thrust for fusion has been a long-standing program. We have spent $4 billion in this country in real dollars and in 1984 dollars we have spent $7 billion to date. We have a program which will definitely bear fruit after the year 2000, if it bears fruit at all.

Senator JOHNSTON. What kind of fruit?

Secretary HODEL. In the form of an energy supply which is essentially an unlimited fuel supply. The technological problems are enormous as you well know.

Senator JOHNSTON. Kind of like fission, too cheap to meter.

Secretary HODEL. I never said that. There are even those who dispute that they ever said that about fission.

Nobody has suggested that it would be too cheap to meter. But because it is a highly complex technology, it is also not inconceivable that there may be ways of accomplishing this that will not be nearly as difficult in terms of engineering, and that is what some of these specific programs are about. But the potential of fusion and the unlimited energy supply which it promises for the world was a great dream. There was a time in the aftermath of the Club of Rome study when the perception was that we were running out of all of our resources. This view gave a real impetus to this program in my estimation; it has many strong supporters among your colleagues as you well know.

To achieve the commercial feasibility of fusion we will go well beyond the year 2000 and will require many billions of dollars of expenditures.

Senator JOHNSTON. Probably beyond the year 2050—or 2030 anyway.

Secretary HODEL. It is a long time and that is only an estimate. We have other countries pursuing the same kind of program. My belief is that if we are to continue an active fusion program, we are going to have to become a collaborator. The term "cooperative" means we exchange information between scientists occasionally. I think the term "collaborative" means we are going to have to scope and develop a program where we and our fellow fusion researchers of the world do it jointly. Instead of each of us spending a half billion dollars a year on a fusion program, we combine our funding and spend $500 million, if that is the appropriate amount, or $750 million, if that is the appropriate amount, but each country's share would be much lower.

Now having set that framework I think, perhaps, if you have specific questions about the technologies and so forth, Dr. Trivelpiece is well equipped to deal with them.

Senator JOHNSTON. Yes, I would like to hear from Dr. Trivelpiece.

Doctor, you might just comment on the justification to increase this program. I am not talking about eliminating the program next year, I am talking about looking at it in a little more hard-headed, realistic way. I mean in this budget I really wonder when we are $483 million, we have not decided which variation of the machine to go with, we don't know or have any idea what the next iteration of the machine is going to cost. Would you expound on that?

Dr. TRIVELPIECE. As you know, the fusion program began in 1952 and it began with high hopes and expectations that some relatively simple experiments would reveal that it was possible to create conditions in an ionized gas where more energy would be released than is required in putting it together. Of course the need was to develop the scientific base for physics although some of the earlier investigators didn't fully appreciate that. It has taken them 20 or 30 years to understand fully the extremely complex situations in plasmas studied in the fusion program.

PROGRAM PROGRESS

The program has made remarkable, systematic, and unfailing progress over that entire period. The quality factor which is the density times the length of time we hold on to the plasma has increased steadily for 25 years. Now, in fact, just this last year, MIT reported that it had passed the threshold in which you can hold on to the plasma longer than is needed to achieve the kind of energy breakeven you are looking for. In 1978, a Princeton experiment demonstrated that the temperature of the plasma could be brought to a level necessary to produce fusion; it, however, remains to achieve those two events in the same experimental device. That device was started as a result of activities that began about 10 years ago in 1973 and 1974, at which time it was decided that the next goal in the fusion program should be to demonstrate energy breakeven through the fusion of tritium and deuterium. There is a direct cause and effect relationship between that statement of goal and the present TFTR device which was dedicated this last year by Secretary Hodel at Princeton.

That experiment is running well. The experimental results are exceeding the expectations of its designers, and in 1986 deuterium and tritium will be used in the TFTR device at Princeton. It is expected then that as much energy as was invested in heating the plasma will be produced by the fusion reactions. Now that will, moreover, demonstrate energy breakeven not only for the United States but for the world, and that will be an important milestone to have passed.

FUTURE DIRECTIONS OF FUSION PROGRAM

Senator JOHNSTON. Where do we go next and at what cost?

Dr. TRIVELPIECE. There is a significant additional scientific step. To put it in the simplest possible terms, the difference between where we would be at the end of our scientific breakeven demonstration and where we would need to go next is this. If you have a log and a blowtorch and you direct the blowtorch on it, you can cause the wood to burn. The wood might be wet or there might not be enough heat reflected back into the log to cause it to burn, but as long as the blowtorch is turned on, it is burning. The TFTR experiment will work approximately like that. As long as the heat from the external source is supplied to the plasma, it will continue to release as much energy as is being invested in causing it to come into existence. Without getting into technical details, one of the artifacts of fusion reaction is that there is a product called an alpha particle that is released in the process. That particle has an orbit size that is larger in physical dimensions than the TFTR device.

What is needed is to design and build the device that has the right magnetic field and the right physical size so that the alpha particles which are released as a result of the fusion reaction have their energy trapped inside the plasma and cause ignition to take place so that, in effect, you have three logs and the blowtorch. You can turn the blowtorch off and the logs will continue to burn. I perceive the trapping of alpha particles for self-heating to be the last major scientific step that is required to be demonstrated before you would be at the point to say, "Yes, we have ignition, we can safely turn off the heaters, the fusion reaction will continue indefinitely and we have a device in which we can demonstrate that capability."

Senator JOHNSTON. There is no hope that Tokamak will be such a device?

Dr. TRIVELPIECE. The expectation is precisely that the next device would be a Tokamak. We have had national and international review committees looking at this possibility. Just recently two of our advisory committees have informed us that they believe that the next step should be what is called a generic burning core experimental device in which the energy released by the alpha particles can be retained in the plasma to produce ignition.

ECONOMICS OF FUSION POWER

Senator JOHNSTON. Dr. Trivelpiece, is there any thought that at any time we will really be able to produce energy in economical terms? There is this problem of scarring the inside of—what do you call it, the reactor or what?

Dr. TRIVELPIECE. The reactor vessel.

Senator JOHNSTON. Reactor vessel, which I understand there is no real answer for. You just have to change that and that produces radioactivity and transuranic waste of its own, is that not correct?

Dr. TRIVELPIECE. Well, there are three major steps. We are approaching what we believe to be the end of the first phase which is involved with demonstration of scientific feasibility and ignition. Should we pass that phase, then certainly there is a very difficult phase which would be the technology and development phase. In this second phase, we would try to return that laboratory result into a system. This process would include such questions as you raised as to what happens at the first wall: Can you make materials that are capable of understanding the neutron flux associated with this process? The answer to your question about producing energy economically is that it would be irresponsible to say, "Yes, we are absolutely certain we can do that," which at the same time, it would be irresponsible to say, "No, because we have not yet answered those technological problems." Preliminary work and estimates that have been done provide some basis to believe that you could, in fact, overcome those problems. In the third and final phase, of course, such a system would need to compete economically with the then current generation of energy sources.

Now I believe it is important to the United States to have the option to explore the possibility of fusion as one of the contributors in a balanced energy resource program as the Secretary has previously mentioned. It would be premature, in my view, to terminate this program having made this investment, before getting an answer to those questions.

Senator JOHNSTON. That was the same argument I made with the Clinch River Breeder Reactor which I think you stated the terms of. That is a machine that had a goal which we could use, we knew it works, and I think it would have fulfilled a need. Frankly, I can't conceive that the inertial confinement fusion or magnetic fusion, either one, will ever be a commercial source of energy. I just can't conceive of that. I can conceive that it would cost billions and billions of dollars, would never be a real economic source of energy. It would be nice to find out—of course we would train some scientists along the way, but that to me is what it is, a basic science training program.

Dr. TRIVELPIECE. It would be a mistake not to point out that it certainly has been a major training ground for scientists, but it has also been a program which has a certain science intensive characteristic to it, while at the same time there has also been a technical aspect to it, too. This technical aspect has come from looking forward to trying to answer the questions you are talking about.

BREEDER FUEL

If I could just add something at this point. If fusion works and generates neutrons as anticipated, then certainly one of the things you can do with the fusion process, is make electricity as you referred to earlier. Another of the things you can do is breeder fuel, although whether it would be superior to or inferior to other schemes of breeding I think remains to be demonstrated technically. But given the inventiveness of mankind I think it would be likely that a supply of neutrons of that sort would find applications, of which not one of us have yet dreamed. There are other possible uses for the high flux of neutrons that might be available; for example, for industrial processes and for supplying industrial heat. These applications may greatly exceed the value that could ever be obtained by pursuing this program for the purpose of selling electricity.

Senator JOHNSTON. There are so many nice machines to make. One of my favorites is the high temperature gas reactor which I think we ought to go forward, particularly as it applies to processed heat. We know we can process heat from that and we know we can satisfy some of the concerns about efficient energy, and yet we are not going into that but we are going blithely along with a multibillion dollar program that you don't have some very vague hope out there that maybe we will find something to use it for sometime late in the next century. I hate to be that strong, but, frankly, that is the way it looks to me.

Let me get on another subject if I may.

BASIC SCIENCE PROCESS

Secretary HODEL. Mr. Chairman, if I could just comment on the last comment you made. I sympathize in many ways and I have in my own mind not looked on fusion as a likely early energy resource. I have looked at it more as a basic science process which we were engaged in not unlike the FERMI lab accelerator and the continuous electron beam accelerator which we talked about earlier today. I also looked at it not only as an important training ground but that some of the physical principles we are challenging there will have applications in other scientific endeavors. In fact, one of the reasons I resist including fusion as a part of the total money we are spending on nuclear is that I think the money we are spending on nuclear fission has a much shorter range utilization for energy production. I see fusion much more as a basic energy sciences type investment. Thus the question you then have is, should we be engaged in that part of the frontier of science or not, and that is a legitimate question you can debate.

Senator JOHNSTON. If you want to know the real truth, the reason that Congress has been supporting fusion so strongly through the years is it is basically misunderstood. People think it is right around the corner, that you have this great source of energy. I think if my colleagues really understood about fusion there would be a lot less support for it.

On the question of accelerators, you know, we had the Isabelle project which I think we put in several hundred million into that over the last 3 or 4 years and we are still trying to figure out what to do there or how to use it. And one of the problems with that was we began it and spent all that money without having plans, objectives, and technical functions that were known and reasonable with the likelihood to produce something.

CONTINUOUS ELECTRON BEAM ACCELERATOR (CEBAF)

Now, the other day I was asked to start a new machine, an accelerator in Virginia, and one of the strongest arguments in favor of it was that my good friend John Warner was for it and I must try to find a way to be for it.

Can you tell me first of all why we need another accelerator?

Secretary HODEL. If I may defer to the expert on this.

Dr. TRIVELPIECE. One of the answers is that one of the advisory committees which we have, Nuclear Science Advisory Committee, has outlined what it perceives to be the priorities in this area of science. One of the things that has occurred in the last few years as a result of understanding of how the interior of the nucleus behaves, is that without getting too technical, the protons and neutrons have internal components called quarks which are bound together in a peculiar way. If you bombard the nucleus of an atom with an electron at a high enough speed, you create a condition in which the quarks inside the atom are not uniquely bound to a given nucleus, neutron, or proton. It is expected that by creating such a state of matter a great deal can be learned about the properties of the interior of a nucleus of an atom.

In order to do that it requires an accelerator that has a particular energy and because the events that are associated with this are very rare, a rate of electrons coming into the nucleus is very high. These two things together mean that what is needed is a continuous current of electrons at an energy of about 4 billion electron volts. This design has been reviewed. There were five proposals that were made. The proposals were reviewed, a selection was made to use SURA as a contractor at that time.

Senator JOHNSTON. Excuse me, if I may interrupt. I have been to SLAC and I know about the quarks and leptons and Strange and Charm and all of those things. I was sold out there in Stanford on the need for them to do what they were doing. It would be a little hard for me to repeat just exactly why it is needed. But I was persuaded that we need to know about these things, and when somebody asks the question they say, "Well, yes, you asked the same question when we are trying to find out about neutrons, electrons, and protons," and that was a good argument to me, but now this is still another accelerator.

How many accelerators do we have all together?

ACCELERATORS PROGRAM

Dr. TRIVELPIECE. In the DOE for nuclear physics program there are probably 11.

Senator JOHNSTON. How many for high-energy physics?

Dr. TRIVELPIECE. Three: the Stanford Linear Accelerator Center, the FERMI lab accelerator, and the AGS that is at the Brookhaven National Laboratory.

Senator JOHNSTON. This is high-energy physics?

Dr. TRIVELPIECE. Yes, those three.

Senator JOHNSTON. Now, DOE wanted the $2 million to develop a plan as to what you were going to do with this new accelerator?

CEBAF PROGRAM PLAN AND COSTS

Dr. TRIVELPIECE. No. The $2 million is what we would normally have been expected to have spent out of operating expenses in order to do a responsible job of determining what the technical characteristics of the proposed device are before coming to you with a request for funding authorization and appropriation. This is the kind of work that we would normally be expected to do even before going to the Office of Management and Budget because they would expect us to tell them exactly what, exactly how much, and exactly how long. Part of that work has been done in the past as a result of the proposals that were submitted. In other words, the various groups that proposed to build this accelerator have done some work with their own money.

I think the State of Virginia supplied a good part of that money in order to prepare for the proposal submitted to the Department. So this is not to be used in the sense of the initiation of a new project. This is for us to complete the activity of determining what information we need in order to meet construction schedules and technical characteristics in order to ask for the right amount of money if we are to proceed so you can consider it intelligently.

Senator JOHNSTON. Can you tell me what CEBAF will do that the other three high-energy accelerators would not do?

Dr. TRIVELPIECE. This is not regarded as a high-energy physics accelerator, it is regarded as a nuclear physics accelerator.

Senator JOHNSTON. Then the other 11?

Dr. TRIVELPIECE. The recognition and the understanding from the theory that has come out is what the characteristics of quarks are. You go to Stanford; Stanford has a very high energy indeed. The beam has a very low current and the beam only occurs in bunches intermittently. The phenomena which we hope to explore here occur with sufficient rarity that you need a high current of electrons and you don't need as high an energy in order to cause the nucleus to essentially almost boil. The quarks are no longer confined in a single neutron or proton but, in fact, are shared among the various neutrons and protons inside a nucleus. With this machine a better understanding of the nucleus of an atom would be achieved.

Senator JOHNSTON. You cannot do that by rewiring the SLAC?

Dr. TRIVELPIECE. No.

Senator JOHNSTON. What have we spent at SLAC all together?

Dr. TRIVELPIECE. It cost about $118 million to operate SLAC in fiscal year 1984.

Senator JOHNSTON. That is the operating budget?

Dr. TRIVELPIECE. That is operating expenses, capital equipment, and construction to operate SLAC in fiscal year 1984.

Senator JOHNSTON. To rebuild SLAC today would cost how much?

Dr. TRIVELPIECE. To rebuild? Oh, certainly more than $200 million I am sure.

Senator JOHNSTON. Do you have any idea how much this one will cost?

Dr. TRIVELPIECE. The preliminary estimates are around $200 million.

Senator JOHNSTON. How do we avoid another Isabelle situation where additional technical and engineering work was required?

Dr. TRIVELPIECE. One of the ways we avoid another Isabelle is to have the kind of reprogramming money that we asked be made available to us in order to define exactly what it is that should be built. You need to have a good technical description of the project, you need to have the kind of design work done in advance before you bring forth the proposal, and we are still in the process of doing that. We are talking about getting information from now until the beginning of the fiscal year and during this budget hearing process.

Senator JOHNSTON. But you have money in this in the 1985 budget which would indicate a decision has been made to build it.

Dr. TRIVELPIECE. Yes, the decision has been made to proceed.

Senator JOHNSTON. Without knowing what it is you are building and what it will cost?

Dr. TRIVELPIECE. There has been a proposal, the proposal has been reviewed, it does have the correct technical elements, and the Department has selected a contractor. This is now being proposed for consideration for the 1985 budget. We do have some additional technical information that we would like to obtain before proceeding with the project and this is the kind of information on technical characteristics of certain accelerator components such as the radio frequency power source. There is also the design of the stretcher ring. We need to do some additional work on that but the basic technical work has already been done.

Senator JOHNSTON. The ring is where you put the electron in to keep it going around?

Dr. TRIVELPIECE. It is an accelerator somewhat like Stanford's design. There electrons are put in a ring and allowed to coast in the ring.

Senator JOHNSTON. You have the linear accelerator as well as the ring here.

Dr. TRIVELPIECE. Yes.

Senator JOHNSTON. You can get all that for $200 million?

Dr. TRIVELPIECE. This is much lower energy compared with Stanford. Stanford is 32 billion electron volts and this is 4 billion electron volts. This is much lower technology than is required for Stanford. What makes this difficult is that the electron beam has to be on continuously and that creates the higher power problems that need to be understood a little better.

Senator JOHNSTON. Mr. Secretary, if you have not seen these accelerators, you should. The one at Stanford—they had a comparison like it used enough electricity to light the city of San Francisco. Of course they don't have it turned on all the time. Or was it all of California?

Secretary HODEL. Mr. Chairman, I have been there and they are energy-intensive activities and the local utility likes to be notified of the operation schedules.

I may say that the concern I have is that the scientific community when it decides that projects such as this has high merits, as it has apparently decided about this project, has a considerable ability to persuade the Congress that such projects should be funded. I would dread seeing us have money in future budgets without having done the preliminary work that we need to do in order to scope it out and perhaps identify what a $200 million facility really is. At this point that is probably corrected by my science advisor here, but my impression is that is a sophisticated back of the envelope estimate, what we really need is to start off——

Senator JOHNSTON. Bottom of the envelope estimate.

Secretary HODEL. Perhaps, the real cost.

Senator JOHNSTON. I can tell you, I am no scientist and I don't pretend to be, but you cannot build this machine for $200 million. I would stake my reputation on that. I don't know anything much about it.

Secretary HODEL. One of the further problems—I am sure we both have experience—we go into these programs once we have made the decision to do it, with a commitment to finish them in the least time possible. We are in the budget process, which at our end results in stretchouts and sometimes this end results in additional stretchouts or differences of opinion on how the money should be allocated and I think that contributes to the problem.

BROOKHAVEN

We sometimes find by the time we get something to the point where it is ready to be built that science and technology have passed us by. In the case of Brookhaven, when that project was started it would have been frontier technology in that area, but we took long enough to do it, and because there were some technical problems, other accelerators in the world passed us by and there was no point in completing it. I must say it was extremely difficult to turn it off. They have a constitutency, these accelerators, as you well know.

Senator JOHNSTON. I am a strong supporter of the scientific community to support basic science, but I know enough about the community to know that they want a new accelerator about every 2 years and they always end up costing more than we thought and more to operate. Yes, we should do basic science but there is a limit, and we have some other more practical research to do like how to control acid rain, like we need to do more work on—what do you call it, coal burning—fluidized bed, and we really need to put some money in the fluidized bed and a whole range of other things and I just—forgive me for appearing flippant, I am not really flippant on this issue because, as I say, you will find out I have been a strong supporter in the past but that is the trouble with us conservatives, we tend to be very skeptical about starting new programs.

I was here when we started Isabelle and I have seen $100 or $200 million, I won't say it all went down the drain because I am sure we have learned some things, but basically I am skeptical about starting these new, undefined programs. I am even skeptical about Senator Hatfield's solar energy programs. Since he is not here I can speak about that. [Laughter.]

NEW STARTS

I think we need to look at these new starts and new endeavors with a very businesslike eye, because once you get them started they are very expensive to terminate and, of course, I think we should have finished Clinch River Breeder Reactor. I repeat, I think that this was a good endeavor.

Secretary HODEL. Mr. Chairman, I think before you were here I did respond to Senator Hatfield with regard to the fact that on the super conductoring, super collider which is a study effort that we are undertaking right now, what I am trying to do is make sure that we have sufficient information to make an honest estimate of its real cost. I want to keep us from talking in terms of somewhere between $2 and $8 billion for openers, which is as close as we could get now. I share your concern about the budget. I do want the record to show that I have already expressed to the chairman of this committee that I solidly support solar and other renewable resources.

Senator JOHNSTON. I hasten to say I do, too.

Secretary HODEL. I just need to be on the record on that score.

Senator JOHNSTON. Well, I do too, but we were up to a billion dollars at one time on solar and the so-called renewables. We have gotten very little for our research. That does not mean that solar is not a great resource, but it means the Government is not the one that you can get the results. It has got to be gotten by the market by making it cheaper and cheaper and by making better machines. I also know on things like ocean energy systems, so-called OTEC program—and that is a bottomless pit—that if it ever works it has application in only two or three places in this country and not produce a great deal of energy.

Well, again I have got my skeptical hat on today and I wait to be educated. There may indeed be an education job to be done on all of these programs.

Is there anything else you would like to add, Mr. Secretary?

CONTINUOUS ELECTRON BEAM ACCELERATOR

Secretary HODEL. Just that in an effort to be able to respond to the proper and tough questions which you are going to continue to ask, I am sure, on this Continuous Electron Beam Accelerator, we do feel that it is an appropriate expenditure of the money to use the $2 million on scoping it in fiscal year 1984 as we have talked about earlier, so we don't head into 1985 attempting to justify a project on which we have not done our homework. I think we need to do that homework first.

Senator JOHNSTON. Before you decide whether to put it in the 1985 budget.

Secretary HODEL. We have decided to maintain it in the 1985 budget to the extent that we have placed only $2 million of design money in the 1985 proposed budget. I would be very hard pressed to support and sustain a full budget construction request based on the information we now have.

ADDITIONAL PREPARED QUESTIONS FOR THE RECORD

Senator JOHNSTON. Thank you very much, Mr. Secretary. It is a pleasure to have you here.

There are some other questions that have been prepared for Senator Hatfield, which I will place in the record for your response. Also Senator DeConcini has submitted some questions as well.

Secretary HODEL. Thank you very much. We will be pleased to respond, Senator.

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Funding for Energy Defense Safeguards and Security

Question: Why is there a need for additional expenditures in nuclear safeguards and security activities?

Answer: Considerable progress has been made during the last year in identifying and correcting deficiencies and improving safeguards and security at key nuclear facilities. An increased appropriation is necessary to continue this progress in the face of constantly changing threats that are becoming increasingly sophisticated. We continue to apply state-of-the-art methods devised by experts in physical protection and nuclear safeguards in order to avert malevolent acts that might have catastrophic consequences.

A major portion of the budget request will support field implementation of improved safeguards and security methods and site upgrading. Major field assistance projects are planned to improve physical protection and material control and accountability at virtually all DOE facilities and special nuclear materials or vital operations. Comprehensive vulnerability analyses will be used to direct the most effective implementation of advanced access denial systems, state-of-the-art intrusion detection instruments, surveillance equipment, integrated security communications systems, and guard force response capabilities.

We are expanding and realigning our inspection and evaluation program so that we can conduct more frequent and comprehensive assessments of the effectiveness of the Department's protective programs at critical facilities. We are also requesting support to begin operation of a safeguards and security centralized training facility. Advanced guard force tactical training and a detailed curriculum on various aspects of physical security will be developed, implemented, and evaluated at the facility.

Nuclear Waste Program

Question: Why are there delays in meeting the program milestones and what is the Department doing to address this problem?

Answer: To date, the only major milestone which has not yet been met is that of issuing repository siting guidelines. While going through the review process with States and the public, DOE decided that it was essential to expand the process to properly meet the intent of the Act. In the preliminary draft of the Mission Plan, the proposed schedules indicated slippage in meeting certain interim milestones relative to the siting of the first repository. Some of the interim dates prescribed in the Act do not allow sufficient time to complete technical as well as process requirements. For example, the 2 to 3 years allowed in the Act for construction of the exploratory shafts, site characterization and completion of an environmental impact statement for the repository selection is insufficient. Nevertheless, DOE remains committed to meeting the 1998 date to begin accepting waste for permanent disposal.

Question: Is the availability of funding (from utility revenues--1 mil/kilowatt hour fee) slowing progress? If so, should we consider increasing the fee?

Answer: DOE's objective in managing the nuclear waste program is to conduct the program activities within the revenues collected from the utilities. We do not believe that the availability of funding (revenues) is slowing the progress of the program. However, revenue constraints do add to the uncertainty of producing a licensable product within the current milestone for the site characterization phase. This could potentially delay the repository operation milestone. The annual Fee Adequacy Report will more fully address this when submitted to Congress in July 1984.

High Temperature Gas-Cooled Reactor (HTGR) Program

Question: Congress has supported the HTGR program for many years even though there has been no budget request for funding.

During our hearings last year, you said that "in putting together a tight budget, we felt it was appropriate to withdraw from the HTGR."

This year, it appears that the Department has included $35 million for High Temperature Reactors.

Why the apparent change?

Answer: Several studies and assessments recently performed have indicated a need to evaluate the potential of small gas reactors for multiple applications. Advanced concepts including passive safety features that do not rely on engineered equipment in sizes which more nearly match utility needs to meet growth projections will be emphasized. As a result, the Administration is requesting funding beginning in 1985 to guide the development of small gas-cooled reactor systems which best meets the needs of the market.

Question: How much of the program will be directed at the new effort of evaluating the so-called small, inherently safe HTGR?

Answer: Essentially all of the requested funding will either be used in the efforts of evaluating the smaller, more passively safe HTGR's or in conducting supporting technology activities directly applicable to the development of such plants.

Question: What portions of the request, if any, will be applied for technology development for the New Production Reactor designed for Defense programs?

Answer: None of these requested funds will be directly applied to the New Production Reactor; however, essentially all of the supporting technology activities for this program will be of value to this activity in the event that the HTGR system is selected to meet the requirements of this defense program.

Clinch River Breeder Reactor

Question: Is there any funding requested in the FY 1985 budget for activities including termination of the Clinch River Breeder Reactor?

Answer: Funds are not requested in the Breeder Reactor Systems FY 1985 budget for the Clinch River Breeder Reactor project termination activities. It has been proposed to the appropriate Congressional Committees to fund termination activities by transferring funds from prior and current year Uranium Enrichment appropriations in excess of offsetting revenues.

Breeder Reprocessing Facility

Question: Why is no funding included for the breeder reprocessing facility BRET?

Answer: Although the development of breeder reprocessing technology lags both fuel fabrication and reactor technology by a substantial margin, the Department chose not to request funds for the Breeder Reprocessing Engineering Test (BRET) in FY 1985 due to higher priority requirements and a need for overall budget constraint. It is still the Department's plan to develop breeder reprocessing capabilities at an appropriate time in the future.

Extended Burnup

Question: What are the Department's plans for the extended burnup program?

Answer: The Department plans to complete the majority of the projects under the Extended Burnup Program, that is, it plans to complete those projects that are nearly complete now and/or which have low costs to completion. Three large, long-term, high cost-to-completion projects are scheduled for cancellation.

In addition, the Department is initiating a careful evaluation of the costs and of the benefits relative to waste management of this program, in response to a recent GAO report (GAO/RCED-84-111) and a similar request by a House of Representatives subcommittee. We have not yet established a schedule for completing this evaluation, but will attempt to complete it in time for Congressional action on the FY 1985 budget.

Funding For Remedial Action Program

Question: Explain the need for the 54% increase in FY 1985 for the remedial action program.

Answer: The changes in the remedial action program between FY 1984 and FY 1985 are summarized in the table provided for the record.

Changes between FY 1984 and FY 1985 Budgets

	B/A in Millions		
Activity	FY 1984 (Approp)	FY 1985 (Request)	Change from FY 1984 (Percent)
FUSRAP	$ 17.0	$ 16.0	-6
Grand Junction	1.5	1.5	0
UMTRAP	27.9	54.0	+94
Surplus Facilities.......	15.5	30.0	+94
West Valley	36.0	49.4	+37
Program Direction	1.1	1.1	0
Total	$ 99.0	$152.0	+54

The increase of $26.1 million in the UMTRAP is needed to accelerate the pace to comply with the Congressionally mandated 7-year schedule for program completion. Remedial actions will include: completing 60 percent of the work at the Shiprock, New Mexico, processing site and initiating work at the Durango, Colorado, processing site; completing the remedial action at the Canonsburg, Pennsylvania, processing site; completing 30 percent of the remedial action at the Salt Lake City processing site by relocating the tailings to Clive, Utah, under State management; completing cleanup of about 215 vicinity properties at various sites; completing Remedial Action Plans for 5 sites and environmental documents for 4 sites.

The increase in the Surplus Facilities program provides $16.1 million to begin the dismantlement of the reactor plant systems and components under the Shippingport Station Decommissioning Project. This project fulfills the Department of Energy obligation under the terms of the lease to make the plant radiation safe after termination of operations. The decommissioning of this pressurized water reactor will demonstrate that such reactors can be safely dismantled at reasonable cost as compared to the cost of construction.

In accordance with Public Law 96-368, the West Valley Demonstration Project will demonstrate the solidification of the high-level waste stored at West Valley. The most effective demonstration will be the expeditious completion of waste solidification and preparation for permanent disposal. The inherent annual base cost for operations has been identified as the single most important element whereon cost cutting measures can be effective. Within reason, a 2-year change in schedule, while holding to essential project objectives and efforts, has been projected to mean a $20 to $50 million cost difference. A reduced funding level would result in a significant increase in the total project cost estimate and a significant delay in the programmatic goal of a public large-scale demonstration without gaining a meaningful annual budget reduction. Completion of the project on an as soon as practical basis will minimize costs to both the federal and New York State governments.

The increase in the West Valley Project is primarily for completion of the vitrification Component Test Stand so as to begin nonradioactive testing in 1985 of the key components in the solidification system and to initiate equipment design and procurements needed to maintain the schedule leading to processing of high-level waste in 1988. An increase is also required for treating--for example, low-level radioactive waste treatement system--and handling of the increased quantities of low-level and transuranic waste produced by decontamination activities for preparing existing cells for re-use by the project.

Budget for Acid Rain Research

Question: As I understand it, there is $6.5 million included in the environment portion of the budget for acid rain research. What is the total amount requested in FY 85 by DOE for acid rain related activities? Please provide a breakdown and comparison with FY 84.

Answer: The total acid rain budget request for acid rain related activities is $66.06 M. DOE's principal efforts in acid rain are in:

- Policy and Program Assessments
- Interagency Task Force on Acid Precipitation
- Technology Research and Development

The breakdown for this funding is as follows:

	1984	1985
Office of Policy, Safety, and Environment/Office of Energy Research (PE/ER) (Policy assessments, atmospheric sciences, research assignments, other scientific activities........................	$ 3.25 M	$ 8.66 M
Office of Fossil Energy (FE) (Cleanup Technology/Coal Preparation/ Combustion/Interagency Task Force)...........	36.86 M	57.40 M
Total	$40.11 M	$66.06 M

DOE Interagency Task Force Funding Profile (in thousands)

Interagency Task Force Category	1984	1985
A. Natural Sources	$ 0	0
B. Man-Made Sources	260	750
C. Atmospheric Processes*	952	5,260
D. Deposition Monitoring*	550	977
E. Aquatic Impacts*	550	150
F. Terrestrial Impacts*	50	120
G. Materials*	0	0
H. Control Technology	0	0
I. Assessments and Policy Analysis	1,175	1,400
	$3,247	$8,657

* Environmental Portion

Control Technologies Funding Profile

	1984	1985
o Cleanup Technology/Coal Preparation		
Flue Gas Cleanup	$ 8,100	$14,025
Gas Stream Cleanup	7,000	4,975
Waste Management	2,900	2,000
Coal Preparation	8,000	11,150
Subtotal	26,000	32,150
o Combustion Systems		
AFB Combustion	1,400	2,500
AFB Demo (EPRI/TVA)	--	15,000
PFB Combustion	7,500	5,000
Adv. Combustion Tech.	1,700	2,000
Subtotal	10,600	24,500
o Acid Rain Task Force (Man-Made Sources Work Group)	260	750
Total	$36,860	$57,400

AFB - Atmospheric Fluidized Bed
PFB - Pressurized Fluidized Bed

Funding for Supercomputers

Question: What is the total funding included for supercomputers in the Departments FY 1985 budget? Please provide a breakdown of all activities, amounts, and comparison with FY 1984.

Answer: The Department's funding for supercomputers in FY 1984 is estimated at $20,891,000 in operating expenses and $8,126,000 in capital equipment. For FY 1985, the request is $39,128,000 in operating expenses and $7,650,000 in capital equipment. Details are provided in the following table.

SUPERCOMPUTERS
($ IN THOUSANDS)

	FY 1984 ESTIMATES	FY 1985 REQUEST
OPERATING EXPENSES		
ATOMIC ENERGY DEFENSE ACTIVITIES		
Weapons Activities		
CRAY-1, LLNL	$1,032	$1,225
Class VI/VII, LLNL	3,297	3,858
Class VII, LLNL	--	1,560
CRAY-1, LANL	3,400	3,400
CRAY XMP, LANL	3,400	4,020
Class VI/VII, LANL	2,210	5,500
Class VII, LANL	--	2,300
CRAY-1, SNLA	1,910	--
CRAY-1, SNLL	1,500	1,600
Class VI/VII, SNLA	--	3,200
Subtotal, AEDA	16,749	26,663
ENERGY SUPPLY R&D		
Magnetic Fusion		
CRAY-1, LLNL	3,300	3,300
Class VI/VII, LLNL	--	2,300
Basic Energy Sciences		
Enhanced Class VI/Class VII LLNL	--	3,500
Subtotal, ESR&D	3,300	9,100
URANIUM ENRICHMENT		
Class VI, ORGDP	842	3,365
Subtotal URE	842	3,365
TOTAL OPERATING EXPENSES	$20,891	$39,128
CAPITAL EQUIPMENT		
ATOMIC ENERGY DEFENSE ACTIVITIES		
Weapons Activities		
CRAY-1, LLNL	3,526	--
CRAY-1, LLNL	--	7,650
CRAY-1, SNLA	4,600	--
Subtotal AEDA	8,126	7,650
TOTAL CAPITAL EQUIPMENT	$8,126	$7,650

Supporting Research and Technical Analysis

Question: Why is a 22% increase needed in these activities?

Answer: The increase we are proposing in the Supporting Research and Technical Analysis program budget reflects the Administration's strong support and commitment to long-term basic research even in these times of severe budget stringencies focused on reducing the deficit.

As you are aware a number of programs make up the budget category which we refer to as Supporting Research and Technical Analysis. These include: Basic Energy Sciences, Energy Research Analysis, Advisory and Oversight Program Direction, University Research Support, University Research Instrumentation, Multiprogram General Purpose Facilities, and Policy and Management.

The increase you are referring to occurs in three of the programs. They are Basic Energy Sciences, University Research Support and University Research Instrumentation.

In the case of the Basic Energy Sciences program, the major increases are for (a) operational costs at major facilities, including research reactors and synchrotron radiation sources and associated research at these facilities; (b) continuation of construction authorized in FY 1984, and (c) a new initiative in applied mathematics utilizing advanced computers. Other increases include providing General Purpose Equipment and General Purpose Facilities to Argonne National Laboratory, an activity previously provided by the Nuclear Energy program and modest research program increases for nuclear data, heavy ion fusion and biological energy research.

In the University Research Support program the increase will permit a doubling of the number of faculty and student research and special training opportunities at the Department's national laboratories. This includes institutes and workshops for high school science and math teachers.

The increase we are proposing in the University Research Instrumentation program will provide for approximately 10 additional research instrumentation awards. These awards are needed in order to provide the Department's university researchers with state-of-the-art scientific instrumentation needed in energy research.

QUESTIONS SUBMITTED BY SENATOR DECONCINI

Terminal Nuclear Waste Program

Question: The entire Arizona Congressional Delegation was pleased to learn of your recent decision to re-evaluate the utilization of copper in the waste package of the Department's geologic repository deployment program. Could you detail for the Committee what this re-evaluation will include and when we can expect a final Departmental decision on the use of copper? Further, could you explain for the record what made you change your mind on the use of copper?

Answer: The Department is considering the use of copper as a possible waste package material in a geologic repository. In particular, copper will be evaluated for the non-salt media under consideration for the first repository, along with other candidate materials, based on structural and corrosion performance, cost, availability, and fabrication. At this time, the Department is in the process of formulating the detailed plans for evaluating copper as an option for the first repository. We are currently reviewing the screening studies which led to the initial selection of candidate and alternate materials in light of recent comments concerning the performance of copper versus steel in the expected repository environments. It is expected that the current contractors involved in waste package activities at the two non-salt first repository projects will conduct the evaluation; namely, Rockwell Hanford Operations for basalt and Lawrence Livermore National Laboratory for tuff. We currently anticipate that the evaluation will occur over the next few years, consistent with the materials test program being planned for other candidate waste package materials. This program could involve the testing of materials in situ within the exploratory shaft test facilities at the candidate sites, which will not be available until the 1987-1988 time frame. Also, the Department currently plans to initiate a waste package design and materials study for granitic host rocks in 1985 as part of the second repository program that will include an evaluation of copper. Consistent with the 1998 schedule for initial receipt of waste at the first repository, the Department currently anticipates that package material would not need to be available until 1994 or later.

Question: Do you have sufficient funding in the FY 85 budget to complete this re-evaluation? Will the study effect your overall schedule in keeping with the dates set forth in the Nuclear Waste Policy Act?

Answer: DOE believes there is sufficient funding in the FY 1985 budget to evaluate the use of copper as a possible waste package. This evaluation will be part of the materials test program being planned for other candidate waste package materials and should not affect the overall schedule set forth in the Nuclear Waste Policy Act.

Question: Does the Department have the authority to simultaneously consider the design of a terminal waste package and a geologic repository? If not, what authority would this require? Would this have any impact on state primacy plans and the national guidelines? Could you detail that impact.

Answer: DOE has the authority to simultaneously consider different waste packages; and in so doing, this activity would have no impact on the state primacy plans and the national guidelines.

Funding for Solar Energy Research

Question: Funding for solar energy programs in FY 1985 is reduced by approximately $18 million under last year's request. As you know, research and development efforts usually require long-term planning and the benefits to be derived from research today cannot be possibly responsive to tomorrow's crises. In order to plan for future interruptions in oil supplies, we must insure that our search for alternate sources has proven successful and we must have available the kinds of technology information which we know is ready for commercialization. Just because we are experiencing a period of price stability and oil availability, we should not curtail our efforts to advance our domestic efforts. Does the Department's proposed reduction in solar research represent a short-sighted Federal policy that will increase the likelihood of negative consequences of future fuel shortages if the flow of imported oil is interrupted? Why shouldn't the Federal Government continue to assist the private sector to the maximum extent possible until this potential renewable energy source is commercially viable?

Answer: The FY 1985 budget request for solar energy represents a professional judgement on our part as to the level of funding required to sustain the scientific and technical momentum established to date by industry and federal research community. Further, funding of these technologies supports the energy policy objective, as articulated within the Fourth National Energy Policy Plan, of conducting research and development of a number of potentially promising energy supply alternatives to a point where informed private sector decisions can be made regarding the viability of these technologies.

The FY 1985 Solar Energy budget request reflects a strengthening, not a reduction, of support for a long term research and development program. The Department completed full funding of a number of important activities in FY 1984 and has a legitimate requirement for reduced funding in a number of other areas. For instance, funding requirements for test and evaluation of the Barstow facility have dropped from $7.5 million in FY 1984 to $4.5 million in FY 1985, entirely in keeping with a long-standing analysis plan for this project. The FY 1985 Solar Energy budget proposal represents a sound commitment to a stable research program. While individual topics may receive decreased or increased emphasis within the DOE request, several important new initiatives are reflected with Department's Solar Energy proposal illustrating our further commitment in maintaining momentum for these technologies as a whole.

Especially important within the FY 1985 budget request is the increased emphasis upon technology transfer. The Department through these activities seeks to gain additional insights into industrial research priorities early in the federal planning process, and improve upon an already effective technical information program in order to better provide timely knowledge to interested parties in a form responsive to their specific needs.

DOE will also continue to work with the private sector whenever possible on cooperative, mutually beneficial research. As solar energy technologies advance as a result of both private and public research, industry can be expected to increase its investment in technology development and commercialization.

MANAGEMENT AND ADMINISTRATION

STATEMENT OF MARTHA O. HESSE, ASSISTANT SECRETARY FOR MANAGEMENT AND ADMINISTRATION

Senator JOHNSTON. Next, we have Martha O. Hesse, Assistant Secretary for Management and Administration.

Ms. Hesse.

Ms. HESSE. Thank you, Senator.

The Secretary and I have a tradition of joint appearances and there is a pattern starting with our confirmation hearings which you participated in. The Secretary engaged in about 3 or 4 hours of very lively questioning and debate and then he finished and left. It was then my turn and there was not a single question, so we will see how today goes.

I am the spokesman today for the departmental administration appropriation which includes most of the managerial and support service activities of the Department. At this time, with your permission, I would like to submit for the record my prepared statement as well as the six remaining segments of this appropriation.

Senator JOHNSTON. Yes.

[The statements follow:]

STATEMENT OF MARTHA O. HESSE, ASSISTANT SECRETARY FOR MANAGEMENT AND ADMINISTRATION

Mr. Chairman, Members of the Committee:

I am Martha O. Hesse, Assistant Secretary, Management and Administration, of the Department of Energy. I appreciate the opportunity to appear before you today in support of the FY 1985 budget request for the Departmental Administration Appropriation, and Technical Information Services and In-House Energy Management requested in the Energy Supply Research and Development Appropriation.

The total fiscal year 1985 request for these activities is $178.0 million. This includes $143.4 million for salary and related expenses, $134.3 million for support services, $24.0 million for In-House Energy Management and $15.4 million for Technical Information Services. Also included is $115.7 million for the Cost of Work for Others Program, $219.4 million in revenues resulting from this work and a $29.0 million deferral which will be used to offset our FY 1985 request. The overall budget request for these activities reflects $9.7 million in savings resulting from Management Reform Initiatives. Of this amount, $6.4 million consists of savings to be realized from deobligations and initiatives begun in 1984 which offset our FY 1985 request. The remaining $3.3 million in savings are included as offsets in the FY 1985 budget requests for the various organizations within Departmental Administration and the Technical Information Management Program. This request fully supports the goals and strategies as set forth in the National Energy Policy Plan.

My testimony on Departmental Administration will cover Management and Administration, the Office of the Secretary, five multi-purpose Operations Offices, and the financial accounts of Cost of Work for Others and Miscellaneous Revenues. Under the Energy Supply Research and Development Appropriation I will discuss the In-House Energy Management Program, Technical Information Services, and Plant Engineering and Design. Although I have given you the total funding levels requested for Departmental Administration, separate statements detailing the requests of the remaining six major organizations under the Departmental Administration Appropriation will be submitted for inclusion in the record. These organizations include General Counsel;

Inspector General; the Office of Minority Economic Impact; the Assistant Secretary for Policy, Safety and Environment; the Assistant Secretary for Congressional, Intergovernmental and Public Affairs; and the Assistant Secretary for International Affairs and Energy Emergencies.

MANAGEMENT AND ADMINISTRATION

Management and Administration (MA) provides the essential management and institutional systems and services necessary to support the Department's programs and missions. A major goal of Management and Administration continues to be the identification and elimination of waste and costly administrative overhead, while promoting increased efficiency and effectiveness in management, administrative and financial support systems and services.

The FY 1985 request for Management and Administration includes funding for employee salaries, benefits and travel for the Procurement and Assistance Management Directorate, the Office of the Controller, and the Office of Administration. The request also includes support service costs for Headquarters employees. Of the $134.2 million requested in FY 1985, $44.9 million is for salaries and benefits for 1,110 full-time equivalents and $2.0 million for related travel. The support services request of $87.3 million provides for Headquarters space rental, supplies, transportation, communications, printing and security, and purchase of capital equipment. This budget request reflects $0.9 million in savings resulting from Management Reform Initiatives in the areas of administrative organization management, travel management and printing and publications.

OFFICE OF THE SECRETARY

The request for the Office of the Secretary includes $1.6 million for salaries, related expenses and travel costs to support 31 full-time equivalents.

OPERATIONS OFFICES

Five of the eight Operations Offices are multi-purpose and are therefore funded within Departmental Administration Appropriation. Of the $90.1 million requested in FY 1985, $63.7 million is for salaries and benefits for 1,624 full-time equivalents; $2.1 million for travel expenses; and $24.3 million for space rental, utilities, supplies, transportation, communications, related support services and capital equipment.

These five multi-purpose Operations Offices support research and development activities through contract administration and day-to-day management oversight of Government-Owned Contractor-Operated facilities; design, engineering and construction management; procurement; property and real estate management; contractor industrial relations; financial management; and management of related support services. The other three Operations Offices primarily support Defense Activities and are funded by the Atomic Energy Defense Appropriations. The FY 1985 request includes a savings of $1.9 million resulting from the Management Reform Initiatives in the areas of payroll and personnel, administrative organization management, procurement reform and travel management.

COST OF WORK FOR OTHERS AND MISCELLANEOUS REVENUES

Cost of Work for Others covers expenses for materials and services to non-Federal organizations when such products or services are not readily available from alternate sources. Examples of such products and services include special reactor materials, isotopes, and irradiation and test reactor services. The FY 1985 estimate is $115.7 million. The Department will receive an estimated $128.1 million in Miscellaneous Revenues as reimbursements for this work. Revenues estimated at $91.3 million are also earned from the sale of by-products, such as reactor steam and special nuclear materials.

IN-HOUSE ENERGY MANAGEMENT

The FY 1985 request for In-House Energy Management is $24.0 million. The requested amount reflects continuity in the approach toward energy conservation through quick payback retrofit construction projects. The funding level proposed will enable us to further approach the established retrofitting goals outlined in the National Energy Conservation Policy Act of 1978 (P.L. 95-619). The In-House Energy Management Program represents a continuing investment to improve the energy efficiency of DOE buildings, facilities and operations. The program of energy saving retrofits proposed in the FY 1985 budget has a payback period of 2.7 years with annual energy savings to the Department of 535,000 barrels of oil equivalent. Proposed funding also continues the program of conservation surveys to identify future retrofit projects; central plant studies to evaluate the economic feasibility of cogeneration of electricity and other central plant improvements; and model energy conservations programs such as a steam trap improvement program and a boiler operator training program. Continuation of the annual program of quick payback retrofit projects for the Department's facilities reduces outyear utility costs and provides a very high rate return on investment dollars.

TECHNICAL INFORMATION MANAGEMENT PROGRAM

The Technical Information Management Program is a centralized scientific and technical information resources management function for the Department's program managers and contractors. The goals of the Technical Information Management Program are to contribute to DOE's mission in advancing energy and nuclear defense technologies, protect U.S. economic and military security through the effective control and use of scientific and technical energy information as a national and agency resource, and to enhance productivity of energy research and development. The program supports energy research and development by developing Departmentwide policy; conducting an oversight program; and collecting, managing, controlling and disseminating scientific, technical and engineering energy information. The FY 1985 budget request for the Technical Information Management Program is $15.4 million, which includes $14.6 million for operating expenses and $0.8 million for purchase of capital equipment. This request includes support for 172 full-time equivalents. This budget request reflects $0.3 million in savings resulting from Management Reform Initiatives in the area of printing and publications.

PLANT ENGINEERING AND DESIGN

The Department is not requesting separate funding in FY 1985 for Plant Engineering and Design. The purpose of this activity was to identify and support, through the funding of advance Architect - Engineering services, those proposed non-defense construction projects considered critical to the timely accomplishment of the Department's mission. Due to a change in policy, this activity will be funded by the appropriate program in FY 1985.

Mr. Chairman, that concludes my presentation. I will be happy to respond to any questions you or the Committee members may have.

STATEMENT OF HELMUT A. MERKLEIN, ASSISTANT SECRETARY FOR INTERNATIONAL AFFAIRS AND ENERGY EMERGENCIES

Mr. Chairman, Members of the Subcommittee:

It is a pleasure to present testimony before this Subcommittee on the FY 1985 budget request for the Office of International Affairs and Energy Emergencies. I shall be discussing only that portion of my program which is under the jurisdiction of the Deputy Assistant Secretary for International Affairs. As you may be aware, the programs of the Deputy Assistant Secretary for Energy Emergencies were added to those of the Office of International Affairs as of January 23, 1984. The Energy Emergencies budget continues to be under the jurisdiction of the Interior Subcommittee.

PROGRAM AUTHORIZATION AND GOALS

The overall policy role for International Affairs is established by the Department of Energy Organization Act of 1977 (P.L. 95-91). This Act requires the Department to develop and implement international energy policy consistent with domestic energy and U.S. foreign policy and to provide independent technical advice to the President on international energy-related matters.

In accordance with the National Energy Policy Plan (NEPP IV), our program is focussing on the international dimensions of energy supply, energy security, and emergency preparedness as basic elements of an adequate supply of energy in the United States. Our primary international energy goals are to reinforce the international nuclear nonproliferation regime; to advise on policies to remove impediments that hinder free markets; to improve U.S. accessibility in world energy markets, primarily nuclear, oil and gas; and to help shape policies that reduce U.S. vulnerability to energy supply disruptions, predominantly oil. Our areas of responsibility include international nuclear cooperation and nonproliferation (under the Atomic Energy Act and the Nuclear Non-proliferation Act), integration of contingency planning and other elements of department policy with international policy; energy market analysis, and international cooperative arrangements with foreign nations and international energy organizations. Our activities are carried out primarily by our in-house civil service staff, supplemented, as needed, by energy experts in the private sector, universities, national laboratories, and other government agencies.

INTERNATIONAL AFFAIRS PROGRAM ORGANIZATION

The work of the IA program is carried out by four organizations reporting to the Deputy Assistant Secretary for International Affairs:

The Division of International Market & Policy Analysis

This office is responsible for analyzing trends in world energy supply and demand with particular emphasis on the policy aspects of theorectical and empirical developments in academic and industrial research.

The Division of International Policy Integration

This office is responsible for the international aspects of DOE/US participation in contingency planning programs and coordinates and implements policies regarding related US participation in the International Energy Agency (IEA), NATO and the European Community and bilateral relations with major energy consuming nations.

The Division of International Research and Development

This office is responsible for developing and implementing policies for US international energy R&D cooperation and related international trade with energy producing and consuming nations, and for negotiation and administration of the Department's international energy research and development agreements.

The Division of International Nuclear Nonproliferation Policy

This office is responsible, with the Department of State, for developing and implementing US nuclear nonproliferation and (non-R&D) cooperation policies. Export policies are coordinated with the Office of International Security Affairs, Defense Programs.

The FY 1985 Budget request for International Affairs is $4,328,000, an increase of approximately $1 million dollars from 1984. At this level, the Office maintains its current staffing level of 55 FTEs. Requested funding provides for the salaries, benefits, and travel for International Affairs' in-house civil service employees. This level also provides funding for two overseas offices in Tokyo and Paris, including personnel and administrative support, and administrative support for a mission in Vienna.

The FY 1985 budget request for International Policy Studies is $1,250,000, an increase of $1,000,000 from 1984. This funding level will be used primarily to:

- meet IA responsibilities in support of the 1985 Nuclear Nonproliferation Treaty (NNPT) Review Conference. The NNPT Review Conference, scheduled for August 1985 in Geneva, Switzerland, is expected to be attended by all signatories to the treaty, about 90 nations. A successful conference is useful to the viability of the NNPT, a major component in U.S. efforts to prevent nuclear proliferation. International Affairs has the lead DOE responsibility for development of the U.S. position on Article IV, technical cooperation, that is of major concern to the non-aligned nations.
- track fluctuations in world energy supply and demand which greatly affect domestic energy as well as programs of energy cooperation with other nations.

FY 1983/84 ACCOMPLISHMENTS:

- Assistant Secretary Merklein led a DOE team to Europe to explain DOE's revised uranium enrichment contract to our customers in Bern, Brussels (European Communities), Madrid and Stockholm. Comments and suggestions were solicited and, upon his return, were factored into the final revision of the contract that is now in the hands of our customers. A parallel team with International Affairs participation conducted a similar effort with our customers in the Far East.

- Represented the United States in the International Energy Agency (IEA) and helped achieve agreement on a Western policy framework to encourage alternative supplies to Soviet gas.

- Provided technical support for successful conclusion of Agreements for Cooperation for Civil Uses of Atomic Energy with Finland, Norway and Sweden that will allow the export of U.S. material, equipment components and U.S. reactor technology to those countries.

- In response to the Administration's objective of accelerating the review process, acted on over 200 "subsequent arrangements" for the transfer of nuclear material while improving the control mechanism.

- Administered over 100 cooperative energy R&D agreements and other commitments, covering more than 260 projects, with foreign nationals and international organizations including the IEA, NEA, and IAEA which culminated in a positive trade balance of several hundred million dollars for the U.S. Served as the link between U.S. domestic programs and foreign programs.

FY 1985 - FY 1988 Objectives

- Provide a technical base for implementation of a Western policy framework to encourage the development of alternatives to Soviet gas including ensuring and monitoring our energy commitment to the IEA and implementing specific gas emergency measures.
- Analyze trends in international energy markets.
- Continue the historical commitment to maintain and strengthen the international nuclear nonproliferation regime. International Affairs considers nuclear nonproliferation one of its primary statutory responsibilities and will continue to exert its best efforts to assure protection against the spread of sensitive nuclear technologies.
- Support the arrangement of technical cooperation to benefit long-range, high-risk R&D programs.
- Provide energy policy and technical advice on export controls.
- Pursue cooperative efforts emphasizing market forces to reduce vulnerability to supply disruptions.

Accomplishment of our objectives will create an environment that encourages development of alternatives and will provide a sound analytical basis on which to conduct our energy relations with both oil producing and oil consuming nations; establish and maintain a dialogue with other countries on important global energy matters; enhance U.S. international energy R&D cooperative efforts; help reduce the risks of the spread of nuclear weapons; lessen U.S. vulnerability to energy supply disruptions; and provide accurate and reliable advice and support to the Secretary and other energy policymakers.

We look forward to continuing to support the U.S. Government's international energy programs and to working for the improvement of the international energy climate.

Mr. Chairman, this concludes my formal statement. I will be glad to respond to any questions you may have.

STATEMENT OF ROSSLEE G. DOUGLAS, DIRECTOR, OFFICE OF MINORITY ECONOMIC IMPACT

Mr. Chairman, Members of the Subcommittee:

I am Rosslee G. Douglas, Director, Office of Minority Economic Impact (MI). I appreciate the opportunity to discuss the MI budget request for fiscal year 1985.

MI was established in November 1978, pursuant to Section 641 of the National Energy Conservation Policy Act (Public Law 95-619). Its legislative mandate is to advise the Secretary of Energy on the impact of the Department's energy policies, regulations and programs on minorities, and to undertake program activities that would ensure that minorities and minority businesses are afforded an opportunity to participate fully in the Department of Energy's programs.

To assure participation in DOE's program activities at all levels MI is responsible, within the Department, for a number of ongoing minority program activities. These include the following: In the area of Socioeconomic Research the activities are a minority energy assessment model, forecasting minority energy use pattern, policy analysis and a regional assessment project.

The activities in the Management and Technical Assistance area are a minority business enterprise project, an honors vocational training project in energy-related technologies, a minority energy information clearinghouse effort and a Historically Black College and Universities'(HBCUs) management and technical assistance program. In addition to this activity for HBCU's, MI has the lead for the Department for Executive Order 12320 (Historically Black Colleges and Universities). In that regard contributions by DOE Programs to the HBCU's in 1983 increased by 290 percent over FY 1982 obligations. This increase enhances DOE's potential for reaching its overall objective of fostering an adequate supply of energy at reasonable cost with a balanced and mixed energy resource system by assuring a broader base in research and development in educational institutions.

In the area of Financial Asistance the two projects are the loan program mandated in Public Law 95-619 and the Minority Bank Development Program.

All of the above activities are in line with the Administration's philosphy of self-help and are important to minorities and for the country.

My request for FY 1985 is $2,408,000. The following table provides a more detailed breakout.

	FY 1984	FY 1985
Research Program	$ 500	$ 900
Management & Technical Assistance Program	600	950
*Financial Assistance Program	-	-
Program Direction	574	558
	$ 1,674	$ 2,408

The FY 1985 Budget reflects an increase of $734,000.00 or 30 percent. This increase will provide for more research and management and technical assistance project activities such as forecasting of Minority Energy Patterns/Energy Impacts, updating the Minority Energy Assessment Model, Cooperative Development Energy Program and Collaborative DOE/Energy Industry Project for Minority Business Enterprises.

In FY 1984, some of the planned accomplishments will include the following:

I. Research and Policy

- In the area of data base development, the methodology used to assess policy impacts will be improved and the data base updated to incorporate 1980 data.

*Funded from carryover balances of approximately $1,000,000.

- Forecast minority residential energy demand.
- Conduct in-depth analyses of energy topics critical to minorities.
- Conduct regional assessments to advise the Secretary on the impact of DOE's policies, programs, and regulations on minorities and minority businesses.

II. Management and Technical Assistance

- Continue the Cooperative Development Energy Program with minority educational institutions to create minority employment by linking industry-related energy technologies with educational curricula and work study programs.
- Update and increase the number of current assessments of HBCU's capabilities and needs.
- Continue the Minority Honors Training Program, including match-making for three of the funded schools with high technology industries for specialized training, cooperative training, full-time employment and retraining.

III. Financial Assistance

- Continue providing loans.
- Continue to manage the Minority Bank Development Project, which includes minority-owned thrift institutions.

Mr. Chairman, this concludes my remarks, I would be happy to answer any questions which you or the members of your Subcommittee might have concerning MI's programs.

STATEMENT OF JAMES R. RICHARDS, INSPECTOR GENERAL

RESPONSIBILITIES

The statutory responsibilities of the Inspector General, as stated in Section 208, Public Law 95-91, are to detect and prevent fraud and abuse and to promote economy and efficiency in the programs and operations of DOE. These responsibilities relate to the work of over 16,700 employees directly employed by the Department, to about 124,000 people working for DOE contractors at Government-owned, contractor-operated facilities, and to the activities of employees of many thousands of other contractors and grantees of the Department.

The Department of Energy is a complex and multi-missioned Department with missions varying from the assembly of nuclear weapons to the funding of low income weatherization. Further, the Department is second only to the Department of Defense in the amount of its procurement activity. Thus, the audit, inspection, and investigative requirements of DOE are extensive and varied in scope and complexity.

ORGANIZATION

- Audits, Inspections, Investigations -

The Office is organized in three divisions with three Assistant Inspectors General. The Office of Audits functions as the internal auditing arm for the Department and performs the following types of audits: financial and compliance, efficiency and economy, and program results. The Office of Investigations is responsible for the detection and prevention of fraud and abuse. The Office of Inspections is responsible for inspection of DOE's scientific and technical programs and operations. In addition, an Office of Executive Director performs administrative, personnel, policy, planning, and management information functions for the Inspector General.

The field structure for the Office of Audits is composed of an Eastern (Oak Ridge) and Western (Albuquerque) Regional Office with 11 satellite offices, and the Capital Regional Audit Office, located in Germantown, Maryland. The field structure for the Office of Investigations is composed of Regional Investigative Offices at Oak Ridge, Albuquerque, and New Orleans with seven satellite offices, permitting the location of at least one investigator at each of the Department's Operations Offices except Savannah River.

The Inspector General, beginning in FY 1983, has utilized contract auditing performed by private accounting firms and the Defense Contract Audit Agency (DCAA). The FY 1985 budget request includes $6.4 million for auditing by private accounting firms. This is an increase over the $1.8 million made available in FY 1984 from unobligated balance for contract audit by private accounting firms. The DCAA audits non-Government-owned, contractor-operated contractors and subcontractors.

ACCOMPLISHMENTS

During FY 1983, as discussed in our Semiannual Reports for that period and in our budget request, extensive procedures were developed and implemented to provide uniformity of approach to both the conduct of the audits and the reporting of findings. The Department's first fully integrated annual workplan for all audits to be conducted in Fiscal Year 1983 was developed and published. The Office of Audits issued 194 audit reports which primarily resulted from our reviews of departmental contracts. The potential savings relating to audit recommendations for this period was in excess of $40 million with nearly $12 million of this being per annum savings. FY 1983 savings from audit recommendations amounted to approximately $8.76 for each dollar spent.

The purpose of the Office of Inspections is to conduct independent and objective inspections of the Department's scientific and engineering programs and projects and to make specific recommendations to management for changes in programs or project execution for the purpose of improving economy, efficiency and the overall effectiveness of the programs and operations selected for review.

The Office of Inspections has demonstrated that substantial cost-avoidances can be achieved as a result of inspections. During FY 1983, we pointed the way to $41.2 million in cost-avoidances in three of the ten major programs evaluated. First, we identified a $7 million savings in the High-Level Nuclear Waste Immobilization Program with which management agreed. Second, we acted as a catalyst for the conduct of a cost reduction study relative to the Uranium Mill Tailings Remedial Action Program which will result in cost-avoidances of $17.1 million over the life of the project. The cost reduction study was undertaken by management as a result of recommendations made by the Office of Inspections. Finally, as a result of the inspection effort, DOE will receive approximately $17 million more each year for crude oil produced at the Naval Petroleum Reserves.

The Office of Investigations continued its work on discovering and preventing waste, fraud and error. Ninety-two cases were referred to prosecutive authorities and other investigative agencies. Thirty-one of the cases were accepted for prosecution. Monies identified for recovery as a result of investigative cases totaled $216,365 and investigations resulted in recommendations that suspension and debarment actions be initiated against ten firms.

The Federal Managers' Financial Integrity Act of 1982 has had a major impact on our activities. The Inspector General has taken an active role in assisting the Department in meeting the requirements of the Act. The Inspector General is also a member of the Department of Energy's Steering Committee on Internal Controls.

The purpose of the Committee is to provide management oversight, to review the progress and make decisions about the deployment of limited resources to the Department's internal control efforts, and to advise the Secretary on the result of these efforts.

The establishment of the President's Council on Integrity and Efficiency--a combined program of the Inspectors General and the Office of Management and Budget--has resulted in several cooperative efforts with other Inspector General offices, including a review over Government property and a suspension and debarment procedure against contractors engaged in fraudulent practices. The Inspector General is a member of the recently established Prevention Committee of the President's Council.

The Semiannual Report for the first half of FY 1984 will be submitted to you in May 1984.

FUNDING LEVEL

The following is a description of the FY 1984 appropriation and the FY 1985 request:

	FY 1984 Budget Appropriation	FY 1985 Budget Request
Salaries/Other Compensation	$7,249,000	$7,492,000
Benefits	801,000	814,000
Travel	520,000	600,000
Support/Services	150,000 1/	157,000
Contract Auditors		6,400,000
DCAA	5,950,000	5,950,000
Capital Equipment	------	295,000
	$14,670,000	$21,708,000

1/ Excludes $1,800,000 funded from unobligated balances for contract audits.

In FY 1984 we have 180 FTE's and in FY 1985 our request is for 178 FTE's. The major dollar increase from FY 1984 to FY 1985 is for contract audits. Capital equipment funds will be used for the purchase of the GRID computer system. This system is a technological advance which we expect to significantly increase IG productivity. This portable unit will accompany selected audit and inspection teams (or individual investigators) to the work location and assist with analysis of computer or hard copy information through available software programs such as accounting spread sheets and other analytical tools. Reports may be drafted on site and transmitted to the supporting IG office for finalization, reducing the time required for report production and increasing report accuracy.

The Office of Inspector General continues to make steady progress in fulfilling its mandate to detect and prevent fraud and abuse and to promote efficiency and economy in the Department of Energy's programs and operations.

STATEMENT OF JAN W. MARES, ASSISTANT SECRETARY FOR POLICY, SAFETY, AND ENVIRONMENT

I appreciate the opportunity to appear before you today to discuss the FY 1985 budget request for the Department of Energy's Office of Policy, Safety, and Environment. I shall be discussing only the portion of my program which is under to jurisdiction of the Deputy Assistant Secretary for Policy, Planning and Analysis (PPA). As you are aware, the Safety and Environment programs were added to those of Policy, Planning and Analysis as of January 23, 1984, however, these programs are not requested under the appropriation account being addressed today.

POLICY, PLANNING, AND ANALYSIS
ROLE AND RESPONSIBILITIES

The Office of Policy, Planning, and Analysis acts as a principal advisor to the Secretary for formulating and recommending national energy policy and carries out analyses of DOE programs to ensure that they contribute substantially to national energy policy. PPA oversees the analysis of policy issues, development of policy proposals, coordination of these initiatives within the Department and the Executive Branch, and the implementation of resulting policy decisions within Departmental programs. The Office concentrates upon strategic planning issues, analysis of potential policy options, and analytical efforts required for policy development.

Other major PPA efforts on behalf of the Secretary include such cross-cutting issues as the coordination and preparation of the biennial National Energy Policy Plan and the Department's long-range strategic planning process. PPA provides the Secretary with a strong analytical capability that can address policy and planning issues and proposals objectively within a general policy framework.

The policy framework within which PPA discharges its responsibilities is the National Energy Policy Plan which was submitted to the Congress in October 1983. As described in the NEPP, the goal for all of the Department's energy policy actions is to foster an adequate supply of energy at reasonable cost. PPA's analytic, advisory and coordinating activities are undertaken in support of this goal and are designed to assure that DOE activities are consistent with the energy policy strategies set forth in the National Energy Policy Plan -- namely, to minimize federal involvement in energy markets while maintaining public health and safety and environmental quality; and to promote a balanced and mixed energy resource system.

OBJECTIVES AND GOALS

Within the framework of the NEPP, specific objectives for FY 1985, formulated in response to Sections 102, 203, 657 and 801 of Public Law 95-91 are:

- o Analyses of policy-related energy topics of Congressional, Presidential, and Secretarial concern; and

- Further development and implementation of an analytical framework for energy policy, improvement of analytic capability, and expansion of in-depth analyses to provide knowledge for areas of current and potential energy policy concern.

The major goals of the Office of Policy, Planning, and Analysis are:

- To identify major energy policy issues and develop an agenda for their resolutions;

- To create a foundation for better energy policy and programs through improved analysis; and

- To develop and implement throughout the Department, a process for policy guidance and program development and review of policy and program issues.

ACCOMPLISHMENTS

Significant accomplishments include the preparation of economic analysis and studies supporting the Natural Gas Decontrol Legislation and a comprehensive analysis of the status and future outlook of the electric utility industry. Related to Congressionally mandated efforts, PPA prepared U.S. energy projections for the Energy Targets requirement of the Energy Security Act; and developed, prepared, and published the 1983 National Energy Policy Plan.

FY 1985 BUDGET REQUEST

The FY 1985 request reflects a continuation of the kinds of policy initiatives which have historically been supported by the Department of Energy as a Cabinet level agency. This request fully supports the goals and strategies set forth in the National Energy Policy Plan.

The requested level of funding is $6,839,000. The FY 1985 request includes funding for two primary program elements --- policy analysis and system studies and program direction. A breakout is shown below.

BUDGET REQUEST
(BA in thousands)

	FY 1984 Appropriation	FY 1985 Request
Policy Analysis and Systems Studies	$ 3,500	$ 4,500
Program Direction	2,815	2,339
Total	$ 6,315	$ 6,839
Total FTE's	60	50

PPA's request for policy and system studies, those to be performed under contract are $4,500,000. The increase of $1,000,000 in policy studies from FY 1984 will provide for studies and analyses in the areas of emergency preparedness, the environment, coal development, synfuels, and other major energy policy areas which have recently appeared on the Administration's agenda. The total request will provide a high-quality level of studies and analyses of a limited set of major policy issues. Results from these studies are critical to the development of energy policy. A broad range of both short-term and long-term studies and analyses will be conducted, which will provide objective, independent data and analyses relating to current energy issues. The short-term analytical requirements mandated by the Congress, the President, and the Secretary will continue to receive the highest priority in the allocation of PPA's resources.

PPA's request for program direction is $2,339,000 which provides funding for salaries, benefits, and travel expenses to support 50 FTE's. The primary functions of the PPA staff are: formulating and recommending national energy policy and carrying out analyses of DOE programs; overseeing the analysis and implementation of policy issues and decisions; and concentrating upon emerging energy issues.

Mr. Chairman, this concludes my formal presentation. I would be happy to answer any questions you or the Members of your Subcommittee might have.

STATEMENT OF ROBERT C. ODLE, JR., ASSISTANT SECRETARY, CONGRESSIONAL, INTERGOVERNMENTAL, AND PUBLIC AFFAIRS

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to appear before you today to discuss the Office of Congressional, Intergovernmental and Public Affairs. This Office is responsible for developing, managing and ensuring communication of information to the Congress; news media; State, territorial, tribal and local government officials; other Federal agencies; consumer, business and citizen organizations; and the general public; and for promoting competition in the energy industry. This Office assists other DOE components to implement the National Energy Policy Plan (NEPP) by working with the Congress on legislation to promote a balanced and mixed energy resource system.

FY 1984 ACTIVITIES

During FY 1984 this Office's activities are focused on:

- Coordination of Departmental efforts related to the consideration and passage of new and revised legislation in support of NEPP goals, in areas including natural gas decontrol and nuclear regulatory reform;
- Continued efforts to maintain effective communication with the public in order to provide information on energy policy and programs that strengthen the nation's economy and security;
- Participation in the development and implementation of energy programs such as nuclear waste management and emergency preparedness;
- Promotion of prudent development of Indian energy resources through an interagency contract managed by DOE with the Council of Energy Resource Tribes;

- Coordination of DOE activities with State and local governments as well as business and industry and consumer-oriented organizations;
- Advocacy of market-based solutions within DOE and analysis of the impacts of Departmental activities.

FY 1985 BUDGET REQUEST

Paramount of our activities, of course, is coordination with the Congress and support to you and your staffs. In the public affairs area, emphasis will continue on national press relations and a communications management program relating to exhibits, films, public relations campaigns and publications. We will coordinate the most essential intergovernmental and consumer activities, and help to foster the promotion of competition.

STATEMENT OF THEODORE J. GARRISH, GENERAL COUNSEL

Mr. Chairman and members of the committee, I am pleased to submit this statement to assist you in your consideration of the Fiscal Year 1985 budget request for the Office of General Counsel. This request fully supports the goals and strategies as set forth in the Department's National Energy Policy Plan (NEPP IV).

The mission of the Office of General Counsel is to provide the legal services that are necessary for the Secretary and the Department to accomplish their missions. The legal services provided encompass the entire range of the Department's activities, with the exception of the Federal Energy Regulatory Commission, and they include legal counselling, legislative drafting, the development of regulations, and the conduct of litigation. In addition to the legal support services we provide, this office also administers the Department's Standards of Conduct program and Patent program. A few examples will serve to illustrate the range of legal services necessary for the Department's activities during the past year.

One of the most visible ways in which we have served the Government's interests is through litigation. In order to conclude promptly and properly the remaining cases arising under the now-expired Emergency Petroleum Allocation Act's crude oil and petroleum product price control programs, we continued our efforts to arrive at equitable settlements and to pursue litigation, with audit support provided by the Economic Regulatory Administration, where negotiations failed. During the past year, the Department obtained favorable district court decisions in two crude oil overcharge cases with judgments of about $1.7 billion and $200 million, payable to the several states and to the U.S. Treasury, respectively. The Department was awarded judgments of about one billion dollars in another crude oil overcharge case that subsequently was remanded to the agency to develop an appropriate remedy. Litigation concerning alleged pricing violations by crude oil resellers and natural gas liquids processors in excess of one billion dollars continues. The outcome of the many remaining cases has become more certain as a result of the successful defense of actions challenging major provisions of the refiner regulations. The total amount of money that eventually will be recovered as a result of such cases is estimated to be as much as $5 to $6 billion and it will be used to compensate the victims of the overcharges, to the extent that it is possible to do so.

In addition to pursuing litigation where necessary to recover previous overcharges, our attorneys, in conjunction with Department of Justice attorneys, have defended the Department and the Government in an increasing number of lawsuits stemming from our non-regulatory program responsibilities. During the past year our caseload has increased to some 250 cases involving the Department and an additional 400 cases affecting its operating contractors, primarily as a result of claims of radiation injury. Recently, this office has won several key radiation injury cases which may expedite the resolution of the more than 80 such cases, encompassing over 5,000 plaintiffs and $10 billion in claims, which remain.

Not only have our litigation efforts been successful in both defending and pursuing the Government's interests, they also have been utilized to promote the efficient expenditure of our budgetary resources. For example, by intervening in utility proceedings affecting the Department's numerous facilities, we have succeeded in keeping that portion of their operating costs as low as possible. Since 1981 such interventions have resulted in the avoidance of $6.7 million in annually recurring increased costs to the Government and in other interventions $2.1 million in increased costs were avoided.

Although our litigation efforts are possibly the most visible means by which we provide legal support to the Department, other legal services which we provide may have an even greater impact over the longer term. For example, another area of legal work which this office is actively engaged in is the drafting of proposed legislation. One such example was our work which resulted in the introduction of the Administration's proposed natural gas legislation entitled the "Natural Gas Consumer Regulatory Reform Act of 1983."

The legal counsel which this office provides also may affect the conduct of the Department's most critical program responsibilities. In the nuclear area, we have been active in the implementation of the Nuclear Waste Policy Act of 1982, as well as the amendments to the Atomic Energy Act of 1954 concerning the protection of the Department's nuclear sites and information. We assisted in efforts to enhance security at DOE's weapons facilities by working with the Department of Justice, the Federal Bureau of Investigation and the Department of Defense to develop a Memorandum of Understanding between those Departments governing the use of military support in an emergency and by working with the Federal Aviation Administration towards the adoption of appropriate airspace restrictions. The emergency preparedness activities of the Department also required our extensive support including our participation in the International Energy Agency's Fourth Allocation Systems Test and the development of regulations governing the utilization of the Strategic Petroleum Reserve.

In addition to our current activities, we will be pursuing a number of additional initiatives. Such activities include: assisting in the adoption of the Department's final position on the issuance of both the January 1981 and the "clean-up" entitlements lists stemming from the Emergency Petroleum Allocation Act; settlement of a number of major enforcement cases arising during the period of crude oil and petroleum product price controls; and, the development of Guidelines for the Recommendation of Sites for Nuclear Waste Repositories which will be promulgated pursuant to the Nuclear Waste Policy Act.

By ensuring that the activities of the Department are conducted in a manner which fully comports with the law, while avoiding the imposition of unnecessary requirements and burdens, this office is able to make a significant contribution to our national energy policy which is to foster an adequate supply of energy at reasonable costs.

Our budget request for fiscal year 1985 is for $12 million. This will provide $10.6 million for 220 FTE's and the remaining $1.4 million will be utilized for this office's support funding. In addition to the 220 FTE's, an additional 4 FTE's, to be funded from the Nuclear Waste Fund, are being requested for this office. The fiscal year 1985 budget represents a 15 percent decrease from the $14.1 million fiscal year 1984 budget. The savings, which result primarily from a reduction in personnel levels, represents our commitment to achieve a more efficient utilization of resources.

With this budget we believe we can continue to provide the high calibre legal services which this office has furnished to the Department since its formation.

SUMMARY OF REQUEST

Ms. HESSE. These organizations include not only management and administration of the Secretary's office, the Technical Information Center, and the five nondefense operations offices, but also such support services as the General Counsel, the Inspector General, and three Assistant Secretaries—Congressional, Intergovernmental, and Public Affairs; Policy, Safety, and Environment; as well as International Affairs and Energy Emergencies.

Our total request for 1985 for all of these activities is about $433 million in direct costs. This amount is offset by almost $220 million worth of revenues as well as a $29 million deferral from previous years' unused funds, which brings the total to about $178 million. A third of this amount is for salaries and expenses, about a third is for direct support services, and the remaining third is for the cost of work for others.

The overall program level for these activities in 1985 is essentially the same as it was in 1984. The personnel request is also about the same, a slight reduction of about 3 percent overall.

The only request that I would like to mention has to do with financial audits. Good business practice dictates that you have aggressive financial audits, and this year we are requesting through the IG an additional $5 million for financial audits of our various contractors.

With that I think I would be happy to answer any questions that you or anyone else might have.

MORALE WITHIN DOE

Senator JOHNSTON. Thank you very much, Ms. Hesse.

First of all, how is the morale in DOE now? I know for a while when there was talk about terminating DOE the morale was down pretty much. Is it back up now?

Ms. HESSE. I think that morale has improved significantly since the Secretary came to the Department. The budget process has stabilized, the staffing level has stabilized, and I think that he has done a great deal to provide much higher morale and much happier people in the Department.

Senator JOHNSTON. I would guess that that would be so, because when Mr. Hodel came in I think there was a realization that the administration had crossed the Rubicon. On the question of whether we should have a Department of Energy, that is something I support and I am glad to hear that.

EVALUATION OF PROJECT DEMONSTRATIONS

Now second, Ms. Hesse, we have through the years spent a great deal on making demonstrations on solar energy. We have put in photovoltaic arrays, hot water systems, everywhere from the White House to the George Washington Parkway, we are doing it at Georgetown University and visitors' centers all over the world. I am wondering whether you have an inventory of those and whether there is any continuing evaluation of those projects.

Ms. HESSE. Well, certainly, sir, the reduction of energy utilization in the Government is indeed a function of the Department of Energy, not only governmentwide but also in the Department itself, and I am certain that we do have an inventory of the activities that we have undertaken and I will be glad to submit that for the record.

Senator JOHNSTON. I am not talking about just what you have done.

Ms. HESSE. Governmentwide.

Senator JOHNSTON. Through the years an evaluation as to how it worked. That would be somewhat of a job to undertake, but I think it really ought to be done. I am not criticizing you for not having done it, nobody else has done it, but it really ought to be done.

Could you undertake that?

Ms. HESSE. Yes, sir.

Senator JOHNSTON. Relatively modest cost and get me a copy of it.

Ms. HESSE. Yes, sir.

Senator JOHNSTON. I think it is something that we all ought to know about. We are not talking about small change when we look at what we are asked to spend on DOE solar programs, so we ought to find out what the performance has been in the past, how well have they worked, can we say how much energy they have produced. There have been problems with maintenance—what percentage of the day they worked. You know, all of those kinds of things ought to be looked at.

Ms. HESSE. Yes.

[The material requested follows:]

SOLAR AND RENEWABLE ENERGY DEMONSTRATIONS

Question. Over the years, the Department has funded a number of demonstration activities, especially in the solar and renewable energy programs. Is there an inventory of these activities and an evaluation of their performance? If so, please provide it. If not currently available, can it be undertaken? The performance evaluation should include data on maintenance, percent of time working, energy created/saved, et cetera.

Answer. The Department of Energy and its predecessor agencies have sponsored thousands of renewable energy demonstrations over the last 10 years. These projects individually include performance monitoring and evaluation requirements as a means to communicate lessons learned to all other interested parties. The DOE Technical Information Center (TIC) maintains an extensive inventory of performance data which has resulted from sponsored demonstrations. This information is available for extraction to manufacturers and the public and private research communities.

Initial renewable energy demonstrations were in the area of solar heating and cooling. Over 12,000 residential and 300 commercial projects were sponsored totaling $134 million over a 5-year period. Construction and operating experience gained and transferred from this activity has been instrumental in creating a solar heating and cooling industry with 1983 annual sales estimated at approximately $700 million.

In recent years, DOE demonstration activities have concentrated on proof-of-concept projects. These multimillion-dollar facilities include larger scale, more complex processes, and/are usually conducted in cooperation with industry as to maximize technical information transfer. Again these demonstrations have built-in monitoring and evaluation components. Valuable technical and economic data gathered from those projects is being transferred by TIC and the Solar Energy Research Institute to the private sector for further study and analysis. Over the past several years, DOE has sponsored numerous workshops and conferences to provide knowledgeable and interested citizens with the results, including lessons learned, from these programs.

The fiscal year 1985 renewable energy budget request contains increased funding for specific technology transfer activities. Enhanced activity in this area includes the communication of demonstration and other research results, in a timely and responsive manner, to renewable energy researchers, developers, and users.

MANAGEMENT INITIATIVES

Senator JOHNSTON. Your statement indicates the savings of $96 million by making management initiative. Do you think that this figure really is reasonable and was it in line with OMB's original suggestion?

Ms. HESSE. Well, I do indeed think that the figure is reasonable. I think, in fact, that there are many other efficiencies that we can undertake, and we will undertake in the future, which will provide cost savings that will make these programs more efficiently managed but will not affect the program itself.

Senator JOHNSTON. I know, but are they realistic?

Ms. HESSE. I think they are realistic.

Senator JOHNSTON. Do you?

Ms. HESSE. Yes, I do.

Senator JOHNSTON. All right.

Ms. HESSE. The original numbers, of course, were part of the Grace Commission report which I am certain you are familiar with, and also some savings are from Reform 88. The estimates of savings that were in the Grace Commission report were actually much higher than those which we are actually pursuing.

Senator JOHNSTON. I thank you very much, Ms. Hesse.

Ms. HESSE. Thank you.

ADDITIONAL QUESTIONS FOR THE RECORD

Senator JOHNSTON. We appreciate your testimony today. There are some additional questions which I will submit for Senator Hatfield.

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Management Initiatives

Question: Your budget materials only show proposed savings assigned to appropriations accounts. Do you know which programs and activities will be affected? When will you be able to advise the Committee?

Answer: The management initiatives savings targets, with the exception of financial systems reform and that part of the procurement reform initiative dealing with audits, have been distributed among the programs of the Department most likely to achieve savings, and are identified in the narrative justification. It was not possible during budget formulation, and is not possible now, to identify precisely which programs will achieve savings through deobligations and audit recoveries; these savings will be identified as they occur. Since any savings realized will be submitted to the Congress as a proposed deferral, the Committee will be advised at that time as to the programs affected.

Question: There is skepticism within DOE about achieving these savings. If savings are not achieved, how will you distribute this reduction--which amounts to a general reduction--among the individual programs?

Answer: We are confident that we can realize the management initiative savings proposed with the FY 1985 budget. However the Department has proposed appropriation language which has two significant backstops in the event the management initiative savings do not materialize. The first is that to the extent that Inspector General audit savings and deobligation savings do not occur, the appropriation language automatically adjusts the new budget authority to make up the shortage. This is particularly significant since the preponderence of the savings relate to these initiatives.

The second backstop is that we have included additional appropriation transfer authority in our proposed appropriation language. This will give us greater flexibility to achieve the management initiative savings without impacting programs.

Question: The budget allocates a $48 million reduction for management savings to the Energy Supply R&D account. If savings are not found, what prevents the Department from reducing the meager solar program, for example, by $48 million with no reductions in any of the other programs in the $2 billion account?

Answer: The Department is committed to achieving the management initiatives savings reflected in the budget without adverse impact on programs. The appropriation language proposed by the Department will enable us to insure that we take advantage of the savings we realize, while carrying out our programs at the level reflected in the budget.

Unobligated Balances

Question: It appears that there is $77 million in unobligated balances from FY 1984. Please explain - outline the source of these funds.

Answer: The unobligated balances being carried into FY 1984 are from a variety of sources. The sources of funding are outlined below:

I. Source of Unobligated Balances:

A. Operating Expense		
(1) Staffing & staffing related underruns.....	$26,793	
(2) Revenues received in excess of originally forecasted amounts........................	17,838	
(3) Contract closeout adjustments............	8,750	
(4) Demand for products and services were less than anticipated...............	2,857	
(5) Funds for GSA Forrestal move.............	2,141	
(6) Minority Loan program....................	987	
(7) Miscellaneous............................	1,328	
Subtotal, Operating Expenses.............		$60,694
B. Plant and Capital Equipment		
(1) Continuing resolution amounts in excess of program needs........................	12,153	
(2) Delayed capital equipment purchases......	1,569	
(3) Underruns in In-House Energy Management and Plant Engineering and Design.........	2,610	
(4) Miscellaneous...........................	52	
Subtotal, Plant and Capital Equipment....		$16,384
Total, Unobligated Balances..............		$77,078

Question: Your budget justification material shows about $33 million of FY 1984 budget authority unobligated and available in FY 1985. Why is this amount substantially less than the amount shown in FY 1984? What is the source of these funds? Is a similar unobligated balance expected to be available in FY 1986. Why or why not?

Answer: The reason the amount of unobligated balances being carried into FY 1985 is substantially less than being carried into FY 1984 is because a portion of these unobligated balances were deferred from FY 1983 funds into FY 1984 to finance a portion of the FY 1984 program level.

The Department has prepared a program plan for activities funded within the Departmental appropriation with the guidance contained in the FY 1984 Appropriations Bill Conference Report and as a result, use of the entire amount of prior year unobligated balances is not needed in FY 1984. Accordingly, the excess of (approximately $29M) is being deferred into FY 1985 to partially offset the FY 1985 appropriation request. The remaining $4M will be derived from prior year deobligations.

It is likely that some unobligated balances will be carried into FY 1986, however, the magnitude will not be as large as in the past. The Department is currently using its unobligated balances to finance its current program level in both FY 1984 and FY 1985 thereby utilizing all remaining obligational availability by the end of FY 1985.

Revenues

Question: There is $219 million anticipated in offsetting revenues for Departmental Administration in FY 85. Can you describe in general the source of those revenues and why you expect more in FY 85 and FY 84?

Answer: The $219 million anticipated in offsetting collections represent the current estimate of collections received from the sale of products and services. The Departments estimate represents $128 million in collections to be received based upon performing $115 million in the Cost of Work program and $91 million in collections from sales of by-products that have no costs associated within the Departmental Administration Appropriation. These items are incidental by-products of activities funded from other Departmental programs.

In general, the Department's estimate of collections represents the current estimate to be collected from the sale of products and services to non-DOE customers. Examples of such items include special reactor material, isotopes, irradiation and test reactor services, and special testing activities at the Nevada Test Site.

Question: Please provide for the record a breakdown of revenues including sale of by-products for FY 83, FY 84, and FY 85.

Answer: The following table provides a breakdown of revenues including sale of byproducts for FY 83, FY 84, and FY 85 (dollars in thousands):

	FY 1983	FY 1984	FY 1985
Collections from Products Sold:			
o Nuclear Reactor Materials.......	$ 7,240	$ 7,240	$ —
o Radioisotopes..................	6,077	6,803	5,878
o Stable Isotopes................	5,530	6,307	4,873
o Miscellaneous Products..........	17,894	22,154	17,397
-- Cost of foreign sales of weapon components and special materials; timber sales; Americium (by-product of plutonium); and handling charges in conjunction with the sales from isotopes.			
Subtotal, Products Sold...........	$ 36,741	$ 42,504	$ 28,148
Collections from Services Provided:			
o Use of DOE Facilities...........	$ 7,388	$ 3,136	$ 4,678
o Irradiation Services and Test Reactor Experiments.............	3,590	2,895	3,145
o Special Services and Fabrications...................	1,255	1,449	1,768
o Research for Protection of Public Health and Safety........	5,131	5,485	13,176
o Miscellaneous Services..........	68,814	79,770	77,236
-- Services to foreign governments towards the Hot Dry Rock, design, studies and analysis of nuclear test shots; special preparation, protection and shipping of heavy elements; remedial action at reactor sites; training and technology programs and studies; R&D on the tagging of fuel pins; and decontamination services.			
Subtotal, Services Provided........	$ 86,178	$ 92,735	$100,003
Subtotal, Collections..............	$122,919	$135,239	$128,151

Collection Not Associated with Cost of Work:

o Sale of Nuclear Materials	$ 5,490	$ 5,025	$ 9,105
o Sale of Nuclear Products	400	--	--
o Lease of Material	55	55	55
o Recovery of Nuclear Materials	12,201	13,500	24,300
o Lease of Lands	2,500	--	500
o Sale of Timber	34	40	36
o Sale of Reactor Steam	31,300	55,000	57,000
o Miscellaneous	642	760	312
Subtotal, Collections Not Associated with Cost of Work	$ 52,622	$ 74,380	$ 91,308
TOTAL, COLLECTIONS	$175,541	$209,619	$219,459

Funding for In-house Energy Management

Question: Please explain why the FY85 request includes $24 million for In-house Energy Management. For the record, provide a list of all projects with FY85 requirements, total estimated cost, and payback period.

Answer: The FY 1985 In-house Energy Management request for $24 million will provide funding for those projects with the greatest return on investment as well as provide survey funding to continue to identify potential retrofits for future funding. The level of funding is a decision based on our total backlog of retrofit projects and the economic return of individual projects balanced against other Departmental needs. We select projects based upon their life cycle savings rather than simple payback, since different projects have different economic lives. The following is the current tentative list of projects to be funded in FY 1985, which indicates total cost, life time savings to investment ratio, and simple payback period.

FY 1985 MODIFICATIONS FOR ENERGY MANAGEMENT - TENTATIVE LIST 05-Mar-84

SITE	PROJECT TITLE	TOTAL ESTIMATED COST ($K)	SAVINGS TO INVESTMENT RATIO	SIMPLE PAYBACK (YEARS)
OAK RIDGE NATIONAL LAB	REPLACE STEAM LINE INSULATION	100.0	35.1	0.6
PRINCETON PLASMA PHYSICS LAB	C-SITE GAS CONVERSION	190.0	24.4	0.8
Y-12 PLANT	BRINE CENTRAL CHILLER SYSTM, UMS	480.0	14.7	0.9
FERMI NATIONAL ACCELERATOR LAB	REDUCE POWER CONSUMPTION OF LIGHTS	55.0	12.6	1.1
PRINCETON PLASMA PHYSICS LAB	A-SITE GAS CONVERSION	248.0	11.9	1.7
Y-12 PLANT	EXTEND UTITLITY MONITORING SYSTM TO 9201-3	378.0	11.3	1.4
Y-12 PLANT	EXTEND UTILITY MONITORING SYSTM TO 9735-36,39,& 92	257.0	10.5	1.4
BROOKHAVEN NATIONAL LAB	ELECTRIC DEMAND LIMITING	980.0	10.2	1.3
LAWRENCE LIVERMORE NATIONAL LAB	RETROFIT A/C SYSTM CONTROLS & ECON B-131	125.0	9.7	1.3
LAWRENCE BERKLEY LAB	POLE CAPS FOR SWITCHNG MAGNETS-BEVATRON	155.0	9.5	1.4
BROOKHAVEN NATIONAL LAB	IMPROVE EFF OF MAG-AMP UNITS PH-2	950.0	9.0	1.4
LAWRENCE BERKLEY LAB	POLE CAPS QUADRAPOLE MAGNETS BEVATRON	285.0	8.4	1.6
PINELLAS PLANT	BUILDING MONITORING SYSTEM EXPANSION	890.0	8.2	1.4
BROOKHAVEN NATIONAL LAB	CONTROL MODS FOR COE VARIOUS BLDGS	99.0	8.2	2.0
Y-12 PLANT	OFF HRS SHUTDOWN/SETBACK 5 BLDGS	125.0	8.2	2.0
BROOKHAVEN NATIONAL LAB	ELECTRICAL MODS FOR COE VARIOUS BLDGS	120.0	7.6	1.7
KANSAS CITY PLANT	HEAT RECOVERY AT WEST BOILER HOUSE	360.0	7.5	2.4
ARGONNE NATIONAL LAB-EAST	MODIFY ZGS AREA COOLING WATER SYSTM	639.0	7.4	2.1
Y-12 PLANT	HVAC MODS, RM 247, BLDG 9201-5	125.0	7.3	2.2
BROOKHAVEN NATIONAL LAB	INSULATION OF MASONRY WALLS PH-2	930.0	7.2	2.8
FERMI NATIONAL ACCELERATOR LAB	LOW POWER COIL FOR 40D48 MAGNET	255.0	6.5	2.2
Y-12 PLANT	REDUCE FUME HOOD & RM EXHAUST, BLDG 9209	905.0	6.3	2.5
PADUCAH GASEOUS DIFFUSION PLANT	CORRIDOR LIGHTING	73.0	6.2	2.0
PRINCETON PLASMA PHYSICS LAB	RETROFIT OF ELECTRIC MOTORS PHASE 2	283.0	6.0	1.7
Y-12 PLANT	EXTEND UMS TO 9204-2E	330.0	5.8	2.5
Y-12 PLANT	UTILITY MONITORING SYSTM ADD TO BLDGS 9202,9709,04	215.0	5.5	2.8
PORTSMOUTH GASEOUS DIFFUSION PLANT	STM VALVE CONTROL X-100 ADMIN BLDG	51.0	5.0	2.8
PRINCETON PLASMA PHYSICS LAB	VARIABLE FREQUENCY MOTOR DRIVES PH 2	397.0	4.9	2.1
TOTALS		10000.0	8.9	1.8

NOTE: THIS LIST IS TENTATIVE. IT IS CONTINUOUSLY UPDATED BY THE ADDITION OF NEW PROJECTS AS THEY ARE DEVELOPED AND BY THE DELETION OR REVISION OF EXISTING PROJECTS AS THEIR ECONOMIC AND ENGINEERING ANALYSES ARE VALIDATED.

Question: How much is requested for the program of conservation surveys? Please provide a list of planned surveys.

Answer: The FY 1985 request for In-house Energy Management includes $2 million for surveys and studies. The following is a current backlog of surveys and studies awaiting funding. We are currently updating this list and adding additional studies, and the final selection of individual studies for FY 1985 will be made in late Summer. We normally fund some small amount of centralized studies at Headquarters, such as the boiler operator training program, which also identifies central steam plant retrofits; the planned steam trap survey and repair program; and some small amount of conceptual design for line item projects selected for future years funding. This amount is shown at the bottom of the list for Headquarters use.

FY85 SURVEY/STUDY BACKLOG

Ames Laboratory Bldg Energy Survey, Applied Sciences Center	$30,000
Argonne National Lab Gas Turbine/Cogen Study	40,000
Argonne National Lab Optimization of Cogen @ EBR II	30,000
Argonne National Lab Reduce Deep Well Pump Power Consumption	8,000
Brookhaven National Lab Energy Monitoring and Control Study	200,000
Princeton Plasma Physics Laboratory Powerline Carrier Expansion Survey	55,000
Princeton Plasma Physics Laboratory Tokamak Fusion Test Reactor Lighting Survey	40,000
Princeton Plasma Physics Laboratory Energy Monitoring and Control Study	63,000
Princeton Plasma Physics Laboratory Tokamak Fusion Test Reactor Distribution Survey	55,000
Princeton Plasma Physics Laboratory Laboratory Thermographic Survey	66,000
Princeton Plasma Physics Laboratory C & D Site Central Chilled Water, PH.2 Study	50,000
Princeton Plasma Physics Laboratory Heating Ceiling Plenum Supply Air Supply	45,000
Princeton Plasma Physics Laboratory Survey "All Electric" Heating & Cooling Unit	45,000
Princeton Plasma Physics Laboratory Phase 1-A Lab Admin Bldg Controls Survey	35,000
Princeton Plasma Physics Laboratory Process De-ionized Chilled Water Survey	60,000
Princeton Plasma Physics Laboratory Laboratory Electric Motor Survey, PH.2	60,000
Pinellas Plant Emergency Generator Study	50,000
Mound Laboratory Cogeneration-Plant Utilities Study	75,000
Mound Laboratory Evaluate Pressurized Condensate Return System vs. Upgrading Existing System	125,000
Mound Laboratory Off Hours Generation of Cooling, w/Storage Study	30,000

Inhalation Toxicology Research Institute Central Heating/Cooling Evaluation	48,000
Rocky Flats Plant Energy Audit Bldgs 881 & 883	80,000
Rocky Flats Plant Trash Burning Steam Generator Study	30,000
Rocky Flats Plant Convert Stack Gas To Inert Purging Media Study	30,000
Rocky Flats Plant Energy Energy Audit, Bldgs 776, 777 & 778	135,000
Los Alamos National Laboratory Power Plant Back-Pressure Turbine Study	50,000
Los Alamos National Laboratory Energy Conservation Study of Selected Bldgs	140,000
Kansas City Plant Temperature & Humidity Controlled Areas Runaround Loop Study	75,000
Kansas City Plant Chilled Water Secondary Systems - Variable Flow Study	45,000
Kansas City Plant Reduced Fan Speed Study	60,000
Idaho National Laboratory Central Area Cafeteria Heat Recovery Study	30,000
Idaho National Laboratory Energy Conservation Study of MHD Facilities	30,000
Idaho National Laboratory ATR Power Generation, Phase III Study	60,000
Fernald Feed Materials Energy Monitoring and Control & Production Center Central Plant Study	73,000
Oak Ridge National Laboratory Animal Exhaust Recirculation	47,000
Oak Ridge National Laboratory Chilled Water & Brine Pumping Systems Study	53,000
Lawrence Livermore National Laboratory Survey LCW Systems	60,000
Lawrence Livermore National Laboratory Survey Nova Laser Facility Energy Use	30,000
Lawrence Livermore National Laboratory Energy Conservation Survey of 17 Bldgs	17,000
Subtotal	2,255,000
Headquarters Central programs such as Steam trap program, and boiler operator training program, and conceptual design for future In-house Energy Management Construction Line Items.	350,000
Total backlog	$2,605,000

Technical Information Management Program

Question: Please provide a breakdown by object classification of the $15.4 million requested for the Technical Information Management Program:

Answer:

Object Classification		FY 1985 Request Amount (In $1,000's)
11.	Personnel Compensation	$ 5,100
12.	Personnel Benefits	612
21.	Travel and Transportation of Persons	140
22.	Transportation of Things	10
23.	Communication, Utilities and Rent	825
24.	Printing and Reproduction	200
25.	Other Services	6,755
26.	Supplies and Materials	1,000
31.	Equipment	800
	Totals	$15,442

Question: Provide a list of activities or services which are contracted for outside the agency:

Answer:

Acquisition of technical information data base tapes and information tapes
Computerized cataloging and information systems development and operation
Evaluation and processing request for information products
Stocking, maintaining files, controls and distributing products of information
Operating of mail services, master files
Quality assurance services
Bibliographic assistance
Development and evaluation of information products and services
Information retrieval services and systems development
Editing, writing and publication assistance
Printing and production of reports and microfiche
Equipment and facility maintenance
Security Services
Telecommunications and utilities
Studies, analyses, research and development of technical information advanced technology, products and services
Employee training and physical examinations

Question: Describe any analysis by the Department to assess the desirability of contracting out more of these activities.

Answer: The contracted activities listed in the previous question comprise approximately 60% of the TIMP funding. The remaining funds will be used to support the Office of Scientific and Technical Information (OSTI) program management, policy development, oversight and appraisal staff, and management of classified and sensitive information. Since 1977, our analysis of technical information activities has resulted in the activities of over 100 DOE positions being contracted out.

DOE (OSTI) management has been systematically analyzing additional activities that can be contracted out, including the printing facility in 1985.

Consulting Services

Question: For the record, provide all amounts requested by DOE in FY 84 and FY 85 for consulting services, with the appropriations account and program, and a description of the need for consulting services.

Answer: Following is a schedule showing anticipated Department of Energy obligations for consulting and related services in FY 84 and FY 85. This schedule provides a breakdown by appropriation and major program. Amounts for other related services are included because these services, such as, advisory committee expenses, special studies, and some contractor provided management services are similar to consulting services. The Department traditionally shows both consulting and the other services in request materials to Congress.

The Department of Energy's general need for consulting services is to provide the technical expertise and assistance necessary to satisfy the objectives of the diverse programs and to meet national energy related needs. The services are deemed most cost effective (1) because of a lack of specific expertise; (2) because corroboration of conclusions generated in-house are necessary and (3) because the use of consulting services are necessary to increase our ability to provide quick responses to high priority deadlines. Consultants are used to provide advice in designing and developing systems and systems engineering methods; conduct independent evaluations, reviews, and studies; provide unbiased judgements on and new insights to critical program issues; and advise on alterate methods and techniques of accomplishing objectives for such programs as waste management, alcohol and synthetic fuels, and energy related R&D.

The alternative to using consulting services is to expand available staffs to meet requirements. This is not practical because some of the necessary expertise needed to successfully satisfy program requirements is not currently available anywhere in government. Additionally, such expertise cannot be hired by the government because the Federal pay ceiling is not comparable to that of industry. Because the need for consulting services fluctuates, the use of full or part-time employees on a permanent basis is not a feasible alternative. A reduction in the use of consulting services would adversely impact the Department's ability to perform all mission responsibilities in a prompt and thorough manner considering the need to comply with ever changing Federal initiatives, regulations and Congressional mandates.

DEPARTMENT OF ENERGY
ESTIMATED OBLIGATIONS FOR CONSULTANTS AND RELATED SERVICES
FY 1985 CONGRESSIONAL BUDGET REQUEST
(000's in thousands)

Appropriation	Program	Estimated FY 1984			Requested FY 1985		
		Consultant Services	Other Related Services	Total	Consultant Services	Other Related Services	Totals
89X0226	Nuclear Energy - Uranium Supply and Enrichment Activities	20	850	870	20	900	920
89X0218	Strategic Petroleum Reserve	109	480	589	100	150	250
89X0216	Energy Information Administration	182	35	217	170	35	205
89X0224	Energy Supply Research and Development	10	4,589	4,599	10	4,965	4,975
89X0220	Atomic Energy Defense Activities	596	0	596	656	0	656
89X0228	Departmental Administration	178	1,558	1,736	185	2,570	2,755
89X5227	Office of Civilian Radioactive Waste Management, Nuclear Waste Fund	85	12,000	12,085	150	12,000	12,150
89X0219	Environmental Protection, Safety and Emergency Preparedness, Naval Petroleum and Oil Shale Reserves	300	0	300	350	0	350
89X0213	Fossil Energy Research and Development	50	7,590	7,640	50	7,035	7,085
	Departmental Totals	1,530	27,102	28,632	1,691	27,655	29,346

Radiation Injury Claims

Question: Please provide a status report on radiation injury claims against the government and its contractors. Provide the number of cases in general subject areas and amounts of any judgments and rendered against the government or agents.

Answer: There are currently a total of 112 lawsuits against the United States and/or its contractors claiming damage to person or property from radiation. These suits have been brought by former employees of the government by its operating contractors, by former servicemen, by citizens living near government facilities or downwind of the Nevada Test Site.

The cases may be broken into two general categories: (1) Cases arising out of the atmospheric testing of nuclear weapons; and (2) other cases. The following breakdown illustrates these two broad categories as defined among the combinations of defendants:

Cases where only the U.S. is sued:

Atmoshperic Testing cases	32
Non-atmospheric testing cases	10
TOTAL	42

Cases where only government contractors are defendants:

Atmospheric testing cases	31
Non-atmospheric testing cases	10
TOTAL	41

Cases where both the U.S. and its contractors are defendants:

Atmospheric testing cases	17
Non-atmospheric testing cases	12
TOTAL	29

Question: Comment specifically on the recent cases in Utah and other areas close to the Nevada Test Site.

Answer: The principal recent cases involving active litigation in Utah and other areas close to the Nevada Test Site are:

- Allen v. United States -- This litigation includes 1192 consolidated claims on 596 injuries and deaths of persons who lived downwind of the Nevada Test site in the 1950's and early 1960's. They claim that leukemias and cancers were caused by radioactive fallout from the tests. Twenty-four randomly selected cases were tried to the court in the Fall of 1982. The matter is under advisement.

- Timothy v. United States -- This litigation includes consolidated claims on 9 injuries and deaths of persons who lived in Duchesne County, Utah, in the 1950's and early 1960's. They claim that cancers were caused by radioactive fallout from the nuclear weapons tests at Nevada Test Site. None of the cases have been tried; however, the United States has prevailed in three of the cases on motions for summary judgment. Similar motions are being prepared on the remainder of the cases.

- Bullock, et al v. United States -- This is an independent equitable action seeking to set aside a 1956 judgment denying relief to sheepherders who claimed their sheep had died as a result of radioactive fallout from the Nevada Test Site. Plaintiffs base their claim in Rule 60(b), Fed.R. Civ. P., alleging fraud on the Court. The Court ruled in plaintiffs' behalf in August 1982. The Tenth Circuit reversed on November 23, 1983, ruling that the Judge had abused his discretion in deciding for plaintiffs and that there was no evidence to support the allegations of fraud. In a related case, Bullock, et al. v. Pearson, et al. plaintiffs alleged constitutional tort based on their charge that several present and former government officials and others defrauded the Court. Plaintiffs seek damages from these persons in their individual capacities. Plaintiffs have filed notice of appeal to the Tenth Circuit of the District Court's dismissal in this case.

- A number of other cases have been filed, but have been inactive, pending the Courts ruling in Allen v. U.S.

Oil Overcharges

Question: Elaborate on the status of the crude oil overcharge cases.

Answer: The enforcement cases arising out of crude oil transactions can be divided into the judicial cases and the administrative cases. The most significant judicial cases are as follows:

United States v. Exxon, D.D.C. In this case the district court granted the motion of the United States for Summary Judgment in March 1983 and judgment was entered in favor of the Government for more than $1.7 billion in June 1983. The district court directed that this amount be distributed to the States for use in the five programs named in the "Warner Amendment". This case is now on appeal to the Temporary Emergency Court of Appeals and the United States is defending all aspects of the district court decision. A decision on this appeal is likely this year.

Energy Reserves v. United States ("In re Department of Energy Stripper Well Litigation"), D. Kansas This case, involving over $1 billion of overcharges and interest, is now in the remedy phase. The district court has referred the remedy question to the Department of Energy's Office of Hearings and Appeals (OHA). OHA is now conducting a proceeding seeking to determine whether it is feasible to identify the persons who suffered the economic harm from these overcharges and, if it proves to be feasible, to proceed and identify such persons. OHA is under a court-imposed requirement to complete its work on this matter by September 13, 1984. Thereafter, the district court will review OHA's decision.

United States v. Sutton, N.D. Okla. This action involves almost $800 million in overcharges the defendent is alleged to have received by miscertification of crude oil. Cross-motions for summary judgment are pending and the court has set an April 1984 trial date.

Getty v. Department of Energy, D. Del. In this case the district court affirmed in part a remedial order the Department of Energy issued to Getty and entered judgment in favor of the Government for $133 million, to be paid into the U.S. Treasury as miscellaneous receipts. Getty has appealed to the Temporary Emergency Court of Appeals and a decision is expected before mid-summer.

The most significant Proposed Remedial Orders pending in administrative cases before the Office of Hearings and Appeals (OHA) which involve alleged crude oil pricing violations by major refiners are as follows:

Company	Alleged Overcharges
Arco	$42 million + interest from 4/79
Gulf	$578 million + interest from 4/79
Texaco	$882 million + interest from 4/1/79
Marathon	$29.1 million
Crown	$23.5 million

The Arco, Marathon and Gulf cases have been fully briefed, discovery has been completed and they are awaiting final decisions by OHA. The legal and factual issues in the Texaco case have been fully briefed. The last stages of discovery, involving admissions and supplementary discovery due to revisions in Texaco's defenses, are being completed. An evidentiary hearing may be required. The Proposed Remedial Order directed to Crown was only recently issued (Sept. 28, 1983) and is in the early stages of administrative litigation.

In the event that Remedial Orders are issued in these cases, those orders will be subject to review first by the Federal Energy Regulatory Commission and, if sustained there, in the courts.

Question: How much has been awarded and collected by the government?

Answer: About $1.2 billion has been recovered by the Government to date, almost all through settlement agreements. Potential additional recoveries, including cases such as United States v. Exxon, discussed above, in which the Government has obtained a judgment but in which the judicial process is not yet completed, could amount to as much as $5 to $6 billion. Most of the recoveries that will be obtained through litigation are likely not to take place for several years. Despite the enormous efforts that litigation demands, litigation inevitably proceeds at a slow pace.

Funding for Auditing by Private Accounting Firms

Question: The FY 85 budget request includes $6.4 million, a substantial increase over FY 84, for auditing by private accounting firms. Why is this increase necessary? Please provide a list of all audits in FY 84 and FY 85 with a description of need and funding levels.

Answer: The Department of Energy (DOE) has, for years, been building up a backlog of unaudited contracts. Audits have not been performed at many Government-owned, contractor-operated facilities or the Energy Technology Centers. These facilities account for a large share of the DOE's annual budget. The DOE has 20 separate financial accounting systems. The Federal Managers' Financial Integrity Act and OMB Circular A-123 contain requirements which support the need for comprehensive financial audits, including examinations of internal controls on such accounting systems. The increased funding levels of $1.8 million for FY 1984 and $6.4 million for FY 1985 will allow the Inspector General (IG) to begin to make substantial progress into the audits of these areas.

Even with the increase, we will still have some difficulty in complying with the Comptroller General's standards for audits that we are required by law to follow. For instance, we will be unable to perform very many program results audits. These are audits designed to determine whether the desired results or benefits established by the legislature or other authorizing body are being achieved and whether the agency has considered alternatives that might yield desired results at a lower cost. Our economy and efficiency audits, which look into management and utilization of resources, will be greater than in the past, but the amount we will be able to perform will not cover all the functions within the Department. This can be seen in the chart on pages 270 to 272 of our budget submission. This chart presents our projected effort for specified areas of audit and the dollar impact of those areas.

In summary, the additional funds will be used to increase audit coverage within the Department to reduce waste and mismanagement. Resource studies done both within and by independent sources outside the Department have recommended substantial increases in DOE audits. Contract dollars will go a long way toward helping reduce the backlog of unaudited contracts. In the past, investments in internal audits performed by IG staff have proven to be cost effective. In FY 1982, for example, the benefit to cost ratio was over $6 for every $1 spent. In FY 1983, that ratio improved to over $8.50 for every $1 spent. We are moving in the right direction.

The Annual Audit Workplan for FY 1984 has been provided to the Committee. The Workplan for FY 1985 is currently in the planning stages and will not be available until September 1984.

Procurement Activity

Question: Your statement indicates that DOE is "second only to the DOD in the amount of its procurement activity." Please quantify that statement and elaborate.

Answer: In FY 1983, the Department of Defense obligated $135,462,268, while the Department of Energy obligated $12,226,146 for procurement awards. The third highest agency is the NASA which obligated $6,262,409. This data was extracted from the Federal Procurement Data System on March 2, 1984. The full inventory of all reportable agencies has been submitted to the Committee. We have also provided the Committee with a copy of our Annual Procurement and Federal Assistance Report FY 1983, which presents more detailed information on this Department's procurement and Federal assistance activity.

DEPARTMENT OF ENERGY

ANNUAL PROCUREMENT AND FEDERAL ASSISTANCE REPORT FISCAL YEAR 1983

INTRODUCTION

The information contained in the Department of Energy's "Annual Procurement and Federal Assistance Report FY 1983" was extracted from the Departmental Procurement and Assistance Data System (PADS). PADS is an automated data collection system maintained to track and report on the procurement and Federal assistance processes. The system stores data which is used by functional and procurement management within the Department of Energy, other Federal agencies, Congress, and the general public.

This report was prepared by the Procurement Support Office, Procurement and Assistance Management Directorate.

SUMMARY

The Procurement and Federal assistance activity of the Department of Energy (DOE) is unique in the Federal Government. DOE is generally not a consumer of the technology it develops nor does it procure production quantities of hardware for its own use. DOE is involved in basic and applied research in a wide range of technology areas including the following programs: Nuclear Energy, Nuclear Waste Management, Fossil Energy, Conservation, Renewable Energy, and Nuclear Weapons Development. The DOE procurement activities also support national security in the production and testing of nuclear weapons, and the management of the Strategic Petroleum Reserve and the Naval Petroleum Reserves facilities. With the exception of the national security activities, DOE spends its procurement dollars more as a catalyst for technology development than for acquiring goods and services for its own use. DOE enters into contractual arrangements with large and small firms involved in the technology areas for which it is responsible. In addition, DOE is involved in contractual and Federal assistance activities with educational institutions, non-profit organizations, and state and local governments.

A significant portion of DOE's mission is carried out by contractors operating DOE-owned plants and laboratories. Consequently, a large portion of DOE's procurement obligations are directed toward the funding of such management and operating contracts. For example, management and operating contractors operate the 12 major, multi-program National Laboratories located throughout the United States. These laboratories provide scientific support for DOE programs and provide a scientific staff with various core capabilities to support various technology programs, and also constitute a valuable national resource. The programs carried out in the laboratories range from the most fundamental research in the physical and life sciences to the most advanced goal oriented development of nuclear and alternative energy technologies, as well as nuclear weapons development.

DOE procurement and Federal assistance obligations during fiscal year 1983 totaled $13,952,268,000. Management and operating contractors were awarded 62 percent of the total obligations. Of the remaining 38 percent or $5,250,983,000: 88 percent was obligated for procurement actions over $10,000; 11 percent was used to fund Federal assistance; and small purchase activity accounted for one percent or $48,165,000.

As of September 30, 1983, the total number of active contracts over $10,000 (excluding management and operating contracts) was 5,141. On the same date, 5,522 Federal assistance instruments were active. The total award value of these 10,663 instruments was $34,924,256,000. Ninety-three percent of the award value is composed of procurement awards.

PROCUREMENT ACTIVITY

1. FY 1983 AWARD ACTIVITY

a. Management and Operating Contractors FY 1983 Actions and Obligations

FY 1983 obligations to management and operating contractors represent 65 percent of the total FY 1983 procurement obligations.

Significant subcontracting opportunities are available at these Government-owned, contractor-operated facilities for qualified firms. The contractor names and facility locations are contained in Appendix I.

PROCUREMENT
MANAGEMENT AND OPERATING CONTRACTORS FY 1983 ACTIONS AND OBLIGATIONS

	NUMBER OF ACTIONS	AMOUNT OF OBLIGATIONS (000)
TOTALS	474	$8,701,285

b. FY 1983 Actions and Obligations

This table contains information on FY 1983 procurement obligations. The data does not include purchase orders or awards with management and operating contractors. New awards issued during FY 1983 account for 32 percent of the 8,042 actions that obligated dollars and 11 percent of the amount obligated.

The number of modifications awarded without dollars totaled 3,507. These actions are mainly no cost time extensions and administrative changes.

PROCUREMENT
FY 1983 ACTIONS AND OBLIGATIONS

	NUMBER OF ACTIONS	AMOUNT OF OBLIGATIONS (000)
NEW AWARDS	2,546	$ 521,277
MODIFICATIONS WITH DOLLARS	5,496	4,111,141
SUBTOTALS	8,042	4,632,418
MODIFICATIONS WITHOUT DOLLARS	3,507	-
TOTALS	11,549	$4,632,418

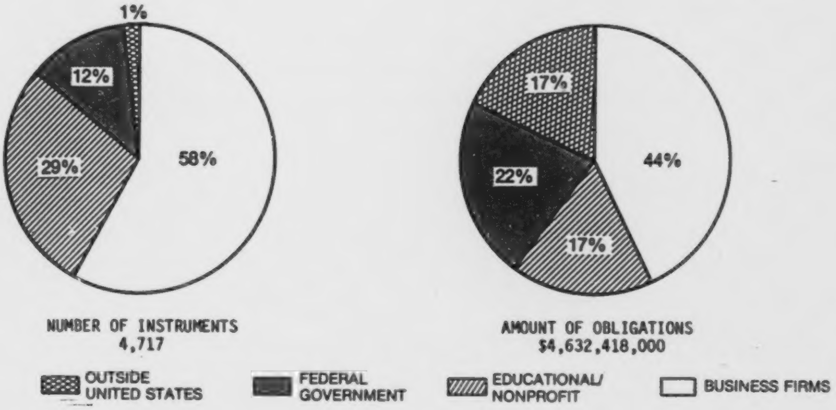
c. FY 1983 Obligations by Organization Type

FY 1983 obligations were awarded through 4,717 separate instruments. The data does not include purchase orders or awards with management and operating contractors.

Business firms, both large and small, received 44 percent of the amount obligated. The Educational/Nonprofit category includes hospitals, state and local governments, educational institutions, and research institutions. The Federal Government category contains data on obligations of $700,000,000 for an interagency agreement with the Defense Logistics Agency for the purchase of crude oil for the Strategic Petroleum Reserve. The data listed in the Outside United States category is for the purchase of goods or services from a source outside the United States and U.S. outlying areas. One of the contracts has obligations of $791,807,000 for the purchase of crude oil for the Stategic Petroleum Reserve from the Mexican Government.

PROCUREMENT
FY 1983 OBLIGATIONS BY ORGANIZATION TYPE

	NUMBER OF INSTRUMENTS	AMOUNT OF OBLIGATIONS (000)
BUSINESS FIRMS	2,761	$2,029,146
EDUCATIONAL/NONPROFIT	1,353	801,897
FEDERAL GOVERNMENT	572	1,007,275
OUTSIDE UNITED STATES	31	794,100
TOTALS	4,717	$4,632,418



NUMBER OF INSTRUMENTS
4,717

AMOUNT OF OBLIGATIONS
$4,632,418,000

d. Geographic Distribution of FY 1983 Obligations

This table lists the actions and obligations distributed by place of performance. The data does not include purchase orders or awards with management and operating contractors. The amount for Virginia includes $700,000,000 for an interagency agreement with the Defense Logistics Agency to purchase crude oil for the Strategic Petroleum Reserve.

The Foreign and U.S. Outlying Areas category contains awards with the place of performance outside of the United States. Eighteen foreign countries and two U.S. outlying areas are the locations for these awards. The Foreign and U.S. Outlying Areas totals contain obligations of $791,807,000 for the direct purchase of crude oil for the Stategic Petroleum Reserve with a place of performance in Mexico.

PROCUREMENT
GEOGRAPHIC DISTRIBUTION OF FY 1983 OBLIGATIONS

PLACE OF PERFORMANCE	NUMBER OF ACTIONS	TOTAL AMOUNT OF OBLIGATIONS (000)
Alabama	19	$ 7,551
Alaska	22	1,899
Arizona	80	10,626
Arkansas	7	1,045
California	951	371,692
Colorado	362	50,358
Connecticut	136	100,316
Delaware	5	278
District of Columbia	718	148,305
Florida	64	23,617
Georgia	73	7,178
Hawaii	13	6,843
Idaho	30	993
Illinois	211	23,306
Indiana	71	10,033
Iowa	16	710
Kansas	28	23,062
Kentucky	20	265,963
Louisiana	78	120,146
Maine	10	975
Maryland	588	78,189
Massachusetts	293	78,278
Michigan	79	28,363
Minnesota	59	5,400

PROCUREMENT
GEOGRAPHIC DISTRIBUTION OF FY 1983 OBLIGATIONS

PLACE OF PERFORMANCE	NUMBER OF ACTIONS	TOTAL AMOUNT OF OBLIGATIONS (000)
Mississippi	24	5,898
Missouri	123	9,298
Montana	30	2,369
Nebraska	15	1,248
Nevada	52	16,919
New Hampshire	25	6,910
New Jersey	153	64,883
New Mexico	558	77,871
New York	367	55,900
North Carolina	47	5,401
North Dakota	42	731
Ohio	515	427,201
Oklahoma	98	20,716
Oregon	50	2,844
Pennsylvania	418	281,459
Rhode Island	18	2,116
South Carolina	62	20,398
South Dakota	29	2,058
Tennessee	153	342,573
Texas	243	142,032
Utah	83	12,509
Vermont	5	1,195
Virginia	641	862,788
Washington	162	75,131
West Virginia	66	14,005
Wisconsin	67	11,182
Wyoming	16	2,539
Foreign and U.S. Outlying Areas	47	799,118
TOTALS	8,042	$4,632,418

e. Top 100 Contractors by FY 1983 Obligations

The top 100 contractors list is arranged in descending order by the amount of procurement obli tions to each contractor during FY 1983. This data does not include awards with management an operating contractors or awards to other Federal agencies.

PROCUREMENT
TOP 100 CONTRACTORS BY FY 1983 OBLIGATIONS

TOTAL OBLIGATIONS MADE TO ALL CONTRACTORS CONSIDERED $3,599,879,000

	CONTRACTOR NAME	NUMBER OF CONTRACT ACTIONS	AMOUNT OF OBLIGATIONS (000)
1.	Westinghouse Electric Corp.	104	$175,017
2.	Stone & Webster Engineering Corp.	13	159,687
3.	Babcock & Wilcox Co.	76	110,934
4.	OVEC Co.	3	105,311
5.	Petroleum Operations & Support Inc.	8	86,980
6.	United Nuclear Corp.	52	75,781
7.	G A Technologies Inc.	63	54,617
8.	Dynamic Industrial Construction	56	54,255
9.	Bechtel National Inc.	34	53,523
10.	General Electric Co.	131	50,637
11.	Garrett Corp.	13	49,136
12.	Massachusetts Institute of Technology	73	49,129
13.	Nuclear Fuel Services Inc.	1	42,782
14.	Boeing Co. Inc.	21	35,849
15.	Goodyear Aerospace Corp.	12	33,223
16.	Burns & Roe Inc.	23	32,636
17.	Electric Energy, Inc.	3	23,166
18.	Catalytic Inc.	10	22,228
19.	Fluor Engineers & Constructors Inc.	12	22,090
20.	California, University of	148	21,795
21.	Black & Veatch	18	21,281
22.	TRW Inc.	43	19,644
23.	West Valley Nuclear Services	11	18,246
24.	Jacobs/D'Appolonia Engineers	4	17,167
25.	Rockwell International	62	16,010
26.	Aerospace Corp.	22	15,932

PROCUREMENT
TOP 100 CONTRACTORS BY FY 1983 OBLIGATIONS (Cont'd)

TOTAL OBLIGATIONS MADE TO ALL CONTRACTORS CONSIDERED $3,599,879,000

	CONTRACTOR NAME	NUMBER OF CONTRACT ACTIONS	AMOUNT OF OBLIGATIONS (000)
27.	Systems Development Corp./Daniel, Mann, Johnson & Mendenhall	5	13,586
28.	Sherman R. Smoot Co. Inc.	45	13,549
29.	Morrison-Knudsen Co. Inc.	11	13,156
30.	Ralph M. Parsons Co.	59	11,803
31.	Kokosing Construction Co.	97	11,664
32.	KMS Fusion Inc.	8	11,194
33.	Leland Stanford Jr. University	51	10,808
34.	EG&G Corp.	17	10,800
35.	Big Chief Drilling Co.	3	10,698
36.	United Technologies	11	10,562
37.	Thacker Construction Co.	10	10,520
38.	Texas, University of	42	10,450
39.	Allied-General Nuclear Services	13	10,163
40.	Rochester, University of	25	9,864
41.	Wisconsin, University of	59	9,750
42.	National Academy of Sciences	19	9,658
43.	Air Products & Chemicals Inc.	7	9,628
44.	Stearns-Rogers Inc.	16	8,823
45.	Swinerton & Walberg Co.	13	8,445
46.	Illinois, University of	48	7,967
47.	Calculon Corp.	22	7,248
48.	Walk Haydel and Assoc.	3	7,069
49.	Butt & Head Inc.	3	6,760
50.	IBM Corp.	131	6,574
51.	Washington, University of	50	6,458
52.	Ferguson Inc.	22	6,458
53.	Gardner Zemke Co.	1	6,289
54.	Yale University	30	6,283
55.	Centel Business Systems	2	6,250
56.	Science Applications Inc.	36	5,948
57.	Industrial Contractors Inc.	4	5,810
58.	Voss International Corp.	9	5,766
59.	OAO Corp.	12	5,752
60.	Ford Motor Co.	9	5,726
61.	Seaward Construction Co. Inc.	12	5,513
62.	Texas A&M University	10	5,490
63.	Maryland, University of	28	5,457
64.	Orkand Corp.	7	5,382
65.	Tennessee Space Institute, University of	8	5,370
66.	Hawaii Electric Co.	2	5,298
67.	Wells Fargo Guard Services	4	5,182
68.	Lockwood Greene Engineers	10	5,039
69.	Seaway Pipeline Inc.	1	5,024
70.	Ocean Thermal Corp.	4	5,000
71.	Thermo Electron Corp.	11	4,964
72.	Sunoco Terminals Inc.	4	4,881
73.	Institute of Gas Technology	15	4,873
74.	Jacobs Engineering Group	10	4,816
75.	Pennsylvania, University of	26	4,808
76.	Michigan, University of	16	4,787
77.	Columbia University	30	4,583
78.	General Telephone Co.	4	4,544
79.	Avco Everett Research Laboratory Inc.	9	4,437
80.	California Institute of Technology	25	4,426
81.	Harvard University	22	4,374
82.	New York University	16	4,322
83.	National Coal Board	6	4,187
84.	McGraw Edison Co.	8	4,178
85.	EDS Federal Corp.	9	4,154
86.	Texas Technical University	3	4,144
87.	Minnesota, University of	38	4,128
88.	Cementation West Inc.	8	4,017
89.	Utah, University of	34	4,008
90.	C E-Lummus	2	4,004
91.	Duquesne Light Co.	1	4,000
92.	Computer Data Systems Inc.	9	3,916
93.	San Juan Coal Sales Co. Inc.	7	3,829
94.	Maxima Corp.	11	3,792
95.	John R. Selby Inc.	8	3,791
96.	Notre Dame, University of	9	3,771
97.	Cornell University	42	3,764
98.	Roy F. Weston Inc.	4	3,723
99.	Superior Casing Crews Inc.	1	3,721
100.	Purdue Research Foundation	39	3,695

2. FY 1983 ADMINISTRATION ACTIVITY

a. Active Contracts by Major Awarding Office

The offices with Head of Procuring Activity (HPA) authority are listed this table. The data for each office includes contracts that were active on September 30, 1983, and awarded by all offices within this HPA. Reference Appendix II for the names of awarding offices. The award value for Washington Operations includes an interagency agreement with the Defense Logistics Agency for the purchase of crude oil for the Strategic Petroleum Reserve with a total award value of $8,151,910,000. Oak Ridge Operations total award value is elevated by six contracts totaling $10,273,744,000 for the procurement of electric power to run the gaseous diffusion plants and for crude oil purchases for the Strategic Petroleum Reserve.

The data does not include purchase orders or awards to management and operating contractors.

PROCUREMENT
ACTIVE CONTRACTS BY MAJOR AWARDING OFFICE

MAJOR AWARDING OFFICE	NUMBER OF ACTIVE CONTRACTS	TOTAL AWARD VALUE OF CONTRACTS (000)
Washington Operations	1,149	$10,487,500
Chicago Operations	1,326	2,542,713
San Francisco Operations	621	1,081,030
Albuquerque Operations	352	935,361
Oak Ridge Operations	805	14,607,605
Richland Operations	126	200,951
Idaho Operations	210	340,228
Nevada Operations	204	455,305
Savannah River Operations	72	35,638
Pittsburgh Naval Reactors	11	760,279
Schenectady Naval Reactors	14	757,791
Western Area Power Administration	215	123,824
Southwestern and Southeastern Power Administration	27	2,912
Alaska Power Administration	9	836
TOTALS	5,141	$32,331,973

b. Geographic Distribution of Total Contract Value for Active Contracts

The data in the following table includes contracts that were active on September 30, 1983. The data does not include purchase orders or awards to management and operating contractors. The award instruments are distributed by place of performance. The data listed for Virginia includes an interagency agreement with the Defense Logistics Agency for the purchase of crude oil for the Strategic Petroleum Reserve with a total award value of $8,151,910,000.

The Foreign and U.S. Outlying Areas category totals represent 22 countries and two U.S. outlying areas.

PROCUREMENT
GEOGRAPHIC DISTRIBUTION OF TOTAL CONTRACT VALUE
FOR ACTIVE CONTRACTS

PLACE OF PERFORMANCE	NUMBER OF ACTIVE CONTRACTS	TOTAL AWARD VALUE OF CONTRACTS (000)
Alabama	23	$ 187,857
Alaska	14	3,958
Arizona	52	28,193
Arkansas	9	15,242
California	544	2,029,799
Colorado	162	211,386
Connecticut	74	757,104
Delaware	8	1,896
District of Columbia	598	937,521
Florida	61	104,161
Georgia	72	25,428
Hawaii	12	34,747
Idaho	75	5,221
Illinois	160	173,790
Indiana	51	84,510
Iowa	22	2,905
Kansas	14	35,014

GEOGRAPHIC DISTRIBUTION OF TOTAL CONTRACT VALUE FOR ACTIVE CONTRACTS (Cont'd)

PLACE OF PERFORMANCE	NUMBER OF ACTIVE CONTRACTS	TOTAL AWARD VALUE OF CONTRACTS (000)
Kentucky	13	2,687,316
Louisiana	50	312,496
Maine	12	6,106
Maryland	349	379,747
Massachusetts	249	609,405
Michigan	57	168,965
Minnesota	46	22,211
Mississippi	18	21,794
Missouri	49	21,541
Montana	22	11,458
Nebraska	18	6,506
Nevada	83	154,187
New Hampshire	19	20,389
New Jersey	95	347,335
New Mexico	152	470,982
New York	315	393,774
North Carolina	38	50,447
North Dakota	7	970
Ohio	201	4,209,712
Oklahoma	66	48,881
Oregon	45	9,843
Pennsylvania	256	1,456,189
Rhode Island	17	16,841
South Carolina	31	31,498
South Dakota	14	3,830
Tennessee	103	2,305,269
Texas	165	499,092
Utah	65	91,443
Vermont	3	1,743
Virginia	343	9,670,992
Washington	107	209,938
West Virginia	45	84,825
Wisconsin	54	80,295
Wyoming	26	8,738
Foreign and U.S. Outlying Areas	57	3,278,483
TOTALS	5,141	$32,331,973

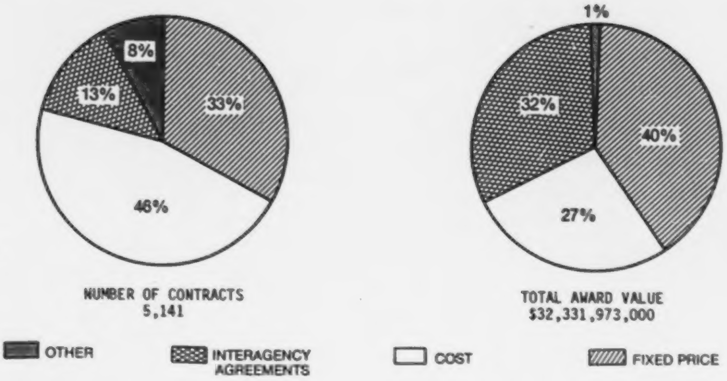
c. Distribution by Contract Type

The data in the following chart includes contracts that were active on September 30, 1983. The data does not include purchase orders or awards to management and operating contracts.

Interagency agreements with other Federal agencies account for 33 percent of the total award value. The data for the Interagency Agreements category contains $8,151,910,000 total award value to the Defense Logistics Agency for the purchase of crude oil for the Strategic Petroleum Reserve. Of the remaining 77 percent or $21,779,193,000, 59 percent of the award value has been awarded to fixed price contracts and 41 percent to cost type contracts.

PROCUREMENT DISTRIBUTION BY CONTRACT TYPE

	NUMBER OF ACTIVE CONTRACTS	TOTAL AWARD VALUE OF CONTRACTS (000)
FIXED PRICE	1,720	$12,834,479
COST	2,377	8,911,143
INTERAGENCY AGREEMENTS	656	10,552,780
OTHER	388	33,571
TOTALS	5,141	$32,331,973



NUMBER OF CONTRACTS
5,141

TOTAL AWARD VALUE
$32,331,973,000

3. SOCIOECONOMIC ACTIVITY

a. DOE Prime Contracts

(1) Socioeconomic Actions and Obligations

This table represents the socioeconomic data of contracts over $10,000 obligated during FY 1983. Awards to management and operating contracts are not included. Individual actions are shown in more than one category if the contractor belonged in more than one group. Thus, an award to a small and disadvantaged business is included under both categories.

PROCUREMENT
DOE PRIME CONTRACTS
SOCIOECONOMIC ACTIONS AND OBLIGATIONS

	NUMBER OF ACTIONS	AMOUNT OF OBLIGATIONS (000)
NEW AWARDS		
SMALL BUSINESS	1,057	$148,124
DISADVANTAGED BUSINESS	173	$ 44,262
LABOR SURPLUS AREA	485	$150,412
WOMEN-OWNED BUSINESS	26	$ 6,575
MODIFICATIONS		
SMALL BUSINESS	2,790	$ 157,036
DISADVANTAGED BUSINESS	609	$ 50,623
LABOR SURPLUS AREA	2,039	$4,932,352
WOMEN-OWNED BUSINESS	80	$ 3,766

(2) Top 100 Small Business Contractors

The top 100 small business contractors are arranged in descending order by net amount of procurement obligations to each small business during FY 1983. Awards to management and operating contractors are not included.

PROCUREMENT
TOP 100 SMALL BUSINESS CONTRACTORS

	CONTRACTOR NAME	NUMBER OF CONTRACT ACTIONS	AMOUNT OF OBLIGATIONS (000)
1.	Sherman R. Smoot Co. Inc.	45	$13,549
2.	KMS Fusion Inc.	8	11,194
3.	Thacker Construction Co.	10	10,520
4.	Walk Haydel & Assoc.	3	7,069
5.	Calculon Corp.	18	6,760
6.	Ferguson Corp.	22	6,428
7.	Industrial Contractors Inc.	4	5,810
8.	OAO Corp.	12	5,752
9.	Seaward Construction Co. Inc.	12	5,513
10.	Orkand Corp.	7	5,382
11.	K.B. Reedy Contracting Corp.	20	3,943
12.	San Juan Coal Sales Co. Inc.	7	3,829
13.	Maxima Corp.	11	3,792

TOP 100 SMALL BUSINESS CONTRACTORS (Cont'd)

	CONTRACTOR NAME	NUMBER OF CONTRACT ACTIONS	AMOUNT OF OBLIGATIONS (000)
14.	John R. Selby Inc.	8	3,791
15.	Roy F. Weston Inc.	4	3,723
16.	Superior Casing Crews Inc.	1	3,721
17.	Mountain States Sheet Metal Co.	3	3,307
18.	Arawak Consulting Corp.	8	3,300
19.	K.L. House Construction Co. Inc.	10	3,256
20.	Gas Cooled Reactor Assoc.	4	2,835
21.	B&A Electric Co.	2	2,563
22.	Meridian Corp.	14	2,288
23.	Krow Construction Inc.	1	2,245
24.	Response Analysis Corp.	6	2,239
25.	Automated Business Systems and Services	8	2,200
26.	Houston Laboratories Inc.	1	2,182
27.	Sterling Systems Inc.	13	2,099
28.	Alvarado Construction Inc.	2	2,073
29.	Applied Management Sciences Inc.	10	2,013
30.	Michael A. Moore & Assoc.	3	1,967
31.	Mechanical Construction Co.	34	1,872
32.	Henry Stock & Son Inc.	9	1,854
33.	Webb Mechanical Enterprises	9	1,853
34.	Brink Construction Co.	9	1,668
35.	Evaluation Technologies Inc.	5	1,664
36.	Dynatrend Inc.	5	1,656
37.	Opus Corp.	1	1,649
38.	Opportunity Systems Inc.	6	1,622
39.	Vanguard Technologies Corp.	7	1,564
40.	Addison Construction Co.	9	1,502
41.	JWK International Corp.	5	1,466
42.	Howard Jess Electric Co.	11	1,435
43.	Price Williams Assoc.	3	1,423
44.	J.R. Roberts Corp.	1	1,412
45.	Western States Mechanical Contractors Inc.	5	1,409
46.	Sunshine Iron Works Inc.	2	1,402
47.	Solar America Co. Inc.	6	1,387
48.	Great Southwestern Construction	3	1,357
49.	Coggins Systems Ltd.	1	1,343
50.	Mathematical Sciences NW Inc.	12	1,322
51.	Authorization Systems Inc.	8	1,309
52.	William Cargile Contractors	10	1,303
53.	Eltec Inc.	1	1,217
54.	High Voltage Breakers Inc.	2	1,210
55.	Gibson Hart Co.	10	1,192
56.	Spectra Research Systems	1	1,179
57.	Edwards Trucking Co. Inc.	2	1,142
58.	Electro Nucleonics Inc.	3	1,114
59.	Leedshill-Herkenhoff Inc.	2	1,080
60.	Yancy Minerals Inc.	1	1,069
61.	Hick & Ingle Corp.	7	1,068
62.	Decision Planning Corp.	20	1,056
63.	ESS Corp.	1	1,051
64.	Technology for Energy Corp.	2	1,041
65.	The Fred B. Debra Co.	1	965
66.	Lutz Daily & Grain Construction Engineers	1	947
67.	Arrow Services Inc.	1	937
68.	Brock International Security	4	922
69.	Jenkins Blaine Construction Co.	2	901
70.	Davis & Assoc. Inc.	94	898
71.	Banes Co.	11	861
72.	New Technologies Inc.	6	859
73.	Martin Electric Co.	2	854
74.	Lillie-Hoffman Cooling Towers	1	841
75.	Peter & Rangel Construction Services Inc.	1	830
76.	R&D Assoc.	5	819
77.	Reynosa Construction Co.	5	813
78.	Acurex Corp.	2	808
79.	Bradley Construction Co. Inc.	6	806
80.	AIA Research Corp.	3	798
81.	Chant Corp.	9	798
82.	Systems & Applied Sciences Corp.	2	797
83.	Allied Riggers Inc.	15	764
84.	R.E. Lee Mechanical Contracting Inc.	9	758
85.	Anderson & Wood Construction Co. Inc.	2	757
86.	Group Operations Inc.	6	751
87.	Gracon Corp.	2	746
88.	Hagler Bailey & Co.	8	745
89.	J&L Electric Co.	3	741
90.	Cole-Templeton Inc.	7	738
91.	EMC Engineers Inc.	6	702
92.	Odell Vinson Oil Field Contractors	2	694

TOP 100 SMALL BUSINESS CONTRACTORS (Cont'd)

	CONTRACTOR NAME	NUMBER OF CONTRACT ACTIONS	AMOUNT OF OBLIGATIONS (000)
93.	Farmer Corp. (NM)	7	677
94.	Reliable Source Inc.	4	664
95.	Resources Inc.	1	664
96	Kingsman Industries Inc.	2	656
97.	Mandex Inc.	1	646
98.	P&M Construction Inc.	1	630
99.	G. A. Brown & Son, Inc.	8	623
100.	Eagle Research Group Inc.	6	613

b. FY 1983 Subcontract Activity of Major DOE Prime Contractors (Including Management and Operating Contractors)

This table presents FY 1983 subcontracting data from major DOE prime contractors. Individual actions are shown in more than one category if the subcontractor belonged in more than one group. Thus, an award to a small and disadvantaged business is included under both categories.

PROCUREMENT
FY 1983 SUBCONTRACT ACTIVITY OF MAJOR DOE PRIME CONTRACTORS (INCLUDING MANAGEMENT AND OPERATING CONTRACTORS)

	NUMBER OF ACTIONS	AMOUNT OF OBLIGATIONS (000)
TOTALS OF SUBCONTRACT ACTIONS	1,022,406	$3,720,558
SMALL BUSINESS	729,086	$1,741,416
DISADVANTAGED BUSINESS	71,325	$ 137,247
LABOR SURPLUS AREA SET-ASIDE	32,187	$ 10,016
WOMEN-OWNED BUSINESS	43,698	$ 92,320

SMALL PURCHASE ACTIVITY

1. FY 1983 ACTIONS AND OBLIGATIONS

This table represents purchase orders and contracts for less than $10,000. Individual actions are included in more than one category if the contractor belonged in more than one group. Thus, an award to a small and disadvantaged business is included under both categories.

SMALL PURCHASE ACTIVITY*
FY 1983 ACTIONS AND OBLIGATIONS

	NUMBER OF ACTIONS	AMOUNT OF OBLIGATIONS (000)
TOTALS FOR SMALL PURCHASES	74,343	$48,165
SMALL BUSINESS	43,899	$24,280
DISADVANTAGED BUSINESS	1,417	$ 828
LABOR SURPLUS AREA SET-ASIDE	234	$ 79
WOMEN-OWNED BUSINESS	623	$ 588

*UNDER $10,000

FEDERAL ASSISTANCE ACTIVITY

1. FY 1983 AWARD ACTIVITY

a. FY 1983 Actions and Obligations

This table contains information on FY 1983 Federal assistance obligations. New awards issued during FY 1983 account for 82 percent of the 3,271 actions that obligated dollars and 25 percent of the amount obligated. The number of modifications awarded without dollars totaled 3,488.

FEDERAL ASSISTANCE
FY 1983 ACTIONS AND OBLIGATIONS

	NUMBER OF ACTIONS	AMOUNT OF OBLIGATIONS (000)
NEW AWARDS	2,684	$147,569
MODIFICATIONS WITH DOLLARS	587	422,831
SUBTOTALS	3,271	570,400
MODIFICATIONS WITHOUT DOLLARS	3,488	-
TOTALS	6,759	$570,400

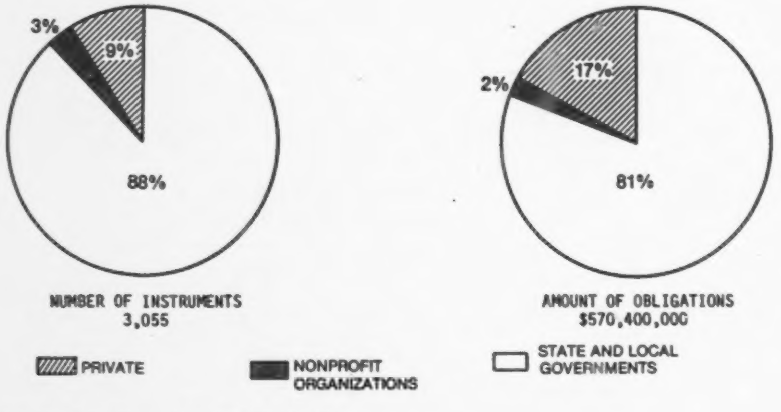
b. FY 1983 Obligations by Recipient Type

FY 1983 obligations were awarded by 3,055 separate instruments.

State and local governments received 81 percent of the amount obligated and 88 percent of the instruments.

FEDERAL ASSISTANCE
FY 1983 OBLIGATIONS BY RECIPIENT TYPE

	NUMBER OF INSTRUMENTS	AMOUNT OF OBLIGATIONS (000)
STATE AND LOCAL GOVERNMENTS	2,698	$462,145
NONPROFIT ORGANIZATIONS	81	10,418
PRIVATE	276	97,837
TOTALS	3,055	$570,400



NUMBER OF INSTRUMENTS
3,055

AMOUNT OF OBLIGATIONS
$570,400,000

c. Geographic Distribution of FY 1983 Obligations

This table lists actions and obligations distributed by place of performance.

The Foreign and U.S. Outlying Areas category contains awards that have a place of performance outside of the United States. Four foreign countries and five U.S. outlying areas are the locations for these awards.

FEDERAL ASSISTANCE
GEOGRAPHIC DISTRIBUTION OF FY 1983 OBLIGATIONS

PLACE OF PERFORMANCE	NUMBER OF ACTIONS	TOTAL AMOUNT OF OBLIGATIONS (000)
Alabama	56	$ 4,443
Alaska	16	2,367
Arizona	29	2,422
Arkansas	34	1,656
California	92	73,545
Colorado	86	8,820
Connecticut	74	6,152
Delaware	36	1,465
District of Columbia	62	3,925
Florida	65	5,187
Georgia	49	5,640
Hawaii	18	1,039
Idaho	30	3,022
Illinois	148	33,482
Indiana	63	10,875
Iowa	66	8,397
Kansas	52	4,371
Kentucky	47	7,157
Louisiana	19	3,182
Maine	56	5,490
Maryland	87	5,842
Massachusetts	109	15,815
Michigan	133	23,285
Minnesota	145	17,945
Mississippi	44	3,319
Missouri	62	10,897
Montana	38	3,802
Nebraska	40	4,628
Nevada	7	1,231
New Hampshire	15	5,350
New Jersey	105	30,520
New Mexico	42	9,041
New York	187	63,208
North Carolina	49	7,053
North Dakota	30	8,754
Ohio	82	20,618
Oklahoma	35	6,017
Oregon	47	4,250
Pennsylvania	173	27,580
Rhode Island	46	2,984
South Carolina	43	24,642
South Dakota	40	3,345
Tennessee	53	7,109
Texas	88	10,288
Utah	44	4,390
Vermont	55	4,038
Virginia	61	8,632
Washington	48	7,935
West Virginia	32	5,081
Wisconsin	131	14,258
Wyoming	15	6,650
Foreign and U.S. Outlying Areas	87	9,256
TOTALS	3,271	$570,400

d. Top 100 Awardees by FY 1983 Obligations

The top 100 awardee list is arranged in descending order of the amount of Federal assistance obligations to each awardee during FY 1983.

FEDERAL ASSISTANCE
TOP 100 AWARDEES BY FY 1983 OBLIGATIONS

TOTAL OBLIGATIONS TO ALL AWARDEES $570,400,000

	AWARDEE NAME	NUMBER OF AWARD ACTIONS	AMOUNT OF OBLIGATIONS (000)
1.	New York	10	$54,761
2.	San Diego Gas & Electric	3	49,943
3.	New Jersey	10	19,968
4.	Pennsylvania	7	18,773
5.	Michigan	10	18,689

TOP 100 AWARDEES BY FY 1983 OBLIGATIONS (Cont'd)

	AWARDEE NAME	NUMBER OF AWARD ACTIONS	AMOUNT OF OBLIGATIONS (000)
6.	Illinois	7	16,628
7.	Ohio	7	15,428
8.	Minnesota	6	13,631
9.	Tri-State Synfuels Co.	1	13,000
10.	Wisconsin	12	10,277
11.	California	7	8,379
12.	Missouri	8	8,187
13.	Massachusetts	14	8,144
14.	Indiana	6	7,908
15.	Curtiss-Wright Corp.	3	7,250
16.	Sacramento Municipal Utility District	1	6,800
17.	Iowa	7	6,671
18.	Colorado	26	6,227
19.	Kentucky	7	5,454
20.	New Hampshire	15	5,302
21.	Washington	17	5,191
22.	Tennessee	8	4,929
23.	North Carolina	7	4,868
24.	North Dakota, University of	2	4,805
25.	Wyoming, University of	2	4,714
26.	Maine	14	4,541
27.	Virginia	9	4,405
28.	Los Alamos Schools	9	4,382
29.	Connecticut	10	4,042
30.	West Virginia	8	3,830
31.	Nebraska	11	3,566
32.	Texas	5	3,475
33.	Oregon	9	3,450
34.	Maryland	12	3,225
35.	Thermo Electron Corp.	1	3,112
36.	Puerto Rico	7	3,045
37.	Kansas	7	3,043
38.	Utah	15	2,967
39.	Southern California Edison Co.	3	2,750
40.	North Dakota	6	2,737
41.	Alabama	11	2,737
42.	Oklahoma	3	2,650
43.	Georgia	4	2,410
44.	Montana	13	2,386
45.	South Dakota	7	2,385
46.	Mississippi	14	2,374
47.	Germany, Federal Republic of	2	2,350
48.	Idaho	11	2,076
49.	Chicago, City of	1	2,000
50.	Vermont	17	1,961
51.	Illinois, University of	3	1,954
52.	Florida	12	1,902
53.	South Carolina	10	1,856
54.	Rhode Island	20	1,806
55.	Louisiana	6	1,637
56.	Los Alamos Inc., County of	11	1,625
57.	Human Services Department (NM)	2	1,558
58.	Alaska	11	1,557
59.	Eastern Illinois University	1	1,532
60.	Southern Illinois University	2	1,517
61.	TRW Inc.	2	1,498
62.	IIT Research Institute	1	1,494
63.	Wyoming	9	1,321
64.	Texas, University of	7	1,282
65.	Rush Presbyterian-Saint Lukes (IL)	1	1,234
66.	Nevada	7	1,231
67.	Carlyle, City of	1	1,154
68.	Green Mountain Power Co.	1	1,154
69.	Cleveland Catholic Diocese	2	1,150
70.	District of Columbia	7	1,128
71.	Massachusetts Institute of Technology	9	1,108
72.	Chicago Read Mental Health Center	1	1,105
73.	Aluminum Co. of America	1	1,100
74.	University City Science Center	1	1,090
75.	Arizona	5	945
76.	Delaware	6	914
77.	Virgin Islands	5	834
78.	Coneg Policy Research Center	2	830
79.	Department of Human Resource Service (FL)	11	760
80.	National Academy of Sciences	14	756
81.	New York State Energy Research	1	750
82.	Charity Hospital of Louisiana	1	715
83.	Council of Great Lakes Governors	2	630
84.	American Samoa	10	584

TOP 100 AWARDEES BY FY 1983 OBLIGATIONS (Cont'd)

	AWARDEE NAME	NUMBER OF AWARD ACTIONS	AMOUNT OF OBLIGATIONS (000)
85.	Health Sciences Center	1	580
86.	California State University	2	571
87.	Chicago, University of	2	561
88.	Texas Medical Center Inc.	1	555
89.	New Mexico	5	545
90.	Spokane School District #81	2	508
91.	Arkansas	5	497
92.	Jefferson County Board of Education	1	489
93.	Hawaii	7	478
94.	Gary Energy Corp.	1	476
95.	NYC Health & Hospitals Corp.	1	476
96.	Bexar County Hospital District	1	475
97.	New York, State University of	7	445
98.	Texas Eastern Synfuel	1	410
99.	Wayne State University	2	406
100.	Southern States Energy Board	6	406

2. FY 1983 ADMINISTRATION ACTIVITY

a. Active Instruments by Major Awarding Office

The offices with Head of Procuring Activity (HPA) authority are listed on this table. The data for each office includes Federal assistance instruments that were active on September 30, 1983, and awarded by all offices within this HPA. Reference Appendix II for the names of awarding offices.

FEDERAL ASSISTANCE
ACTIVE INSTRUMENTS BY MAJOR AWARDING OFFICE

MAJOR AWARDING OFFICE	NUMBER OF ACTIVE INSTRUMENTS	TOTAL VALUE OF AWARDS (000)
Washington Operations	102	$ 144,754
Chicago Operations	3,038	989,231
San Francisco Operations	308	298,876
Albuquerque Operations	421	212,873
Oak Ridge Operations	83	236,415
Richland Operations	185	24,011
Idaho Operations	655	448,058
Nevada Operations	23	9,989
Savannah River Operations	707	228,076
TOTALS	5,522	$2,592,283

b. Geographic Distribution of Total Award Value for Active Instruments

The data in the following table includes Federal assistance instruments that were active on September 30, 1983. The awards are distributed by place of performance. The Foreign and U.S. Outlying Areas totals represent eight countries and five U.S. outlying areas.

FEDERAL ASSISTANCE
GEOGRAPHIC DISTRIBUTION OF TOTAL AWARD VALUE FOR ACTIVE INSTRUMENTS

PLACE OF PERFORMANCE	NUMBER OF ACTIVE INSTRUMENTS	TOTAL VALUE OF AWARDS (000)
Alabama	106	$ 25,813
Alaska	44	5,976
Arizona	49	15,124
Arkansas	38	16,706
California	223	275,724
Colorado	125	39,779
Connecticut	85	27,643
Delaware	61	5,313
District of Columbia	93	26,110
Florida	131	64,675
Georgia	87	27,505
Hawaii	36	7,743
Idaho	64	56,443
Illinois	260	137,614
Indiana	104	61,044
Iowa	84	29,483
Kansas	65	18,633
Kentucky	92	101,806
Louisiana	25	13,346
Maine	89	31,659
Maryland	165	30,434
Massachusetts	193	121,546
Michigan	243	107,596
Minnesota	233	83,177
Mississippi	72	16,693
Missouri	62	44,552
Montana	52	17,680
Nebraska	49	18,977
Nevada	18	9,204

GEOGRAPHIC DISTRIBUTION OF TOTAL AWARD VALUE FOR ACTIVE INSTRUMENTS

PLACE OF PERFORMANCE	NUMBER OF ACTIVE INSTRUMENTS	TOTAL VALUE OF AWARDS (000)
New Hampshire	23	$ 14,782
New Jersey	198	165,474
New Mexico	26	26,965
New York	408	170,031
North Carolina	108	40,560
North Dakota	48	44,308
Ohio	191	102,598
Oklahoma	39	72,002
Oregon	82	9,262
Pennsylvania	290	95,483
Rhode Island	55	11,857
South Carolina	63	25,767
South Dakota	47	17,117
Tennessee	89	36,384
Texas	97	57,157
Utah	77	18,503
Vermont	64	14,126
Virginia	115	40,493
Washington	94	32,981
West Virginia	61	16,905
Wisconsin	251	56,363
Wyoming	35	40,826
Foreign and U.S. Outlying Areas	113	44,341
TOTALS	5,522	$2,592,283

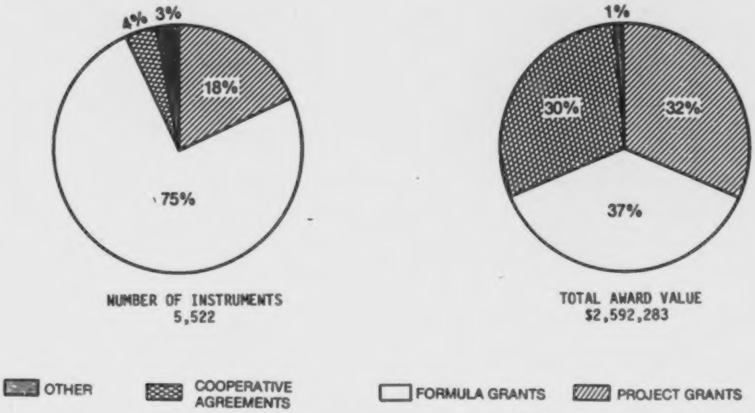
c. Distribution by Assistance Type

The data in the following chart includes Federal assistance instruments that were active on September 30, 1983.

Formula grants account for 37 percent of the total award value and 75 percent of the number of active instruments.

FEDERAL ASSISTANCE
DISTRIBUTION BY ASSISTANCE TYPE

	NUMBER OF ACTIVE INSTRUMENTS	TOTAL VALUE OF AWARDS (000)
PROJECT GRANTS	991	$ 835,373
FORMULA GRANTS	4,161	969,915
COOPERATIVE AGREEMENTS	199	766,877
OTHER	171	20,118
TOTAL	5,522	$2,592,283



NUMBER OF INSTRUMENTS
5,522

TOTAL AWARD VALUE
$2,592,283

UNSOLICITED PROPOSALS

An unsolicited proposal is a written offer to perform a proposed effort submitted by an organization or individual solely on its own initiative with the objective of obtaining financial support and not in response to a specific request made by DOE. DOE considers proposals in all areas of energy and energy-related research and development with emphasis on long-term, high-risk, high-payoff technologies to ensure future energy supplies. Industry is expected to support development and near-term technologies. A proposal may be accepted by DOE if it explores a method, approach, or an idea or carries out research and development and does not duplicate work already underway or contemplated by DOE, and is not already known by DOE, or has previously unrecognized merit or value.

This data represents the amount of total obligations for new awards submitted as unsolicited proposals. The number of actions, which were available for review, as well as the number of actions funded are included.

UNSOLICITED PROPOSALS

	NUMBER		AMOUNT (000)
CARRYOVER TO FY 1983	727		
RECEIVED DURING FY 1983	1,860		
TOTAL FOR REVIEW		2,587	
ACTIONS FUNDED	465		$91,000
ACTIONS DECLINED	1,321		
TOTAL REVIEWED		1,786	
CARRYOVER TO FY 1984		801	

GLOSSARY

The explanations contained in this glossary are not intended to be definitions. They are included only to aid in understanding certain terms as used in this report.

Action - A new award or modification of an already existing award.

Active Instrument - An award instrument that, as of a certain date, has not reached its completion date.

Award Value - Current total value of the award including both Government share and awardee share of cost-sharing awards.

Contract - A binding legal relationship used to purchase goods or services for the direct benefit of the Federal Government.

Contract Type - Specific pricing arrangement employed for the performance of work under contract.

Cooperative Agreement - Assistance instrument with substantial involvement between DOE and recipient.

Cost Type Contract - An agreement by the contractor to conduct work in return for a guarantee of some degree of cost reimbursement.

Federal Assistance - The transfer of money or the assumption of risk, the principal purpose of which is to accomplish a public purpose of support or stimulation authorized by Federal statute. Assistance includes, but is not limited to, grants, cooperative agreements, direct payments, loans and loan guarantees.

Fixed Price Contract - An agreement by the contractor to furnish specified supplies or services at a stipulated price which is usually not subject to adjustment because of performance cost.

Formula Grant - Allocation of money to states or their subdivisions in accordance with a distribution formula prescribed by law or administrative regulation, for activities of a continuing nature not confined to a specific project.

Government-Owned, Contractor-Operated - (GOCO) - A Government-owned facility, such as a National Laboratory, that is managed and operated by a contractor. For the purpose of this report onsite service contractors, whose services are shown in Appendix I, are included in this category.

Interagency Agreement - Procurement action placed with or through other Federal agencies; except orders placed under Federal Supply Schedule contracts and awards to disadvantaged enterprises through the Small Business Administration under Section 8(a) of the Small Business Act.

Modification - Alteration to an existing award.

Obligation - Amount which is the part of the award value actually funded by the Government.

Private - Federal Assistance Recipient Type that includes: private higher education institution, individual, profit organization, small business, all other "private" not covered by another code.

Procurement - Purchase of goods or services with an award instrument, such as a contract or purchase order.

Project Grant - The funding, for fixed or known periods, for a specific project or the delivery of specific services or products without liability for damages for failure to perform.

Purchase Order - Instrument used for open market purchases not in excess of $10,000.

Small Business - A profitmaking concern, which is independently owned and operated, is not dominant in its field and further qualifies under the size standards criteria of the Small Business Administration.

Small Purchase - A procurement of supplies or services (other than personal services) whose total cost is no more than $10,000.

U.S. Outlying Area - American Samoa, Guam, Northern Mariana Islands, Puerto Rico, Trust Territory of the Pacific Islands, and Virgin Islands.

APPENDIX I*

MANAGEMENT AND OPERATING CONTRACTORS' FACILITY LOCATIONS

CONTRACTOR NAME	FACILITY OR SERVICE RENDERED AND LOCATION	CONTRACT NUMBER
Associated Universities, Inc.	Brookhaven National Laboratory Upton, New York	AC02-76CH00016
Battelle Memorial Institute	Pacific Northwest Laboratories Richland, Washington	AC06-76RL01830
Bendix Corp.	Grand Junction Facility Grand Junction, Colorado	AC13-76GJ01664
Bendix Corp.	Kansas City Plant Kansas City, Missouri	AC04-76DP00613
Boeing Computer Services	Computer Center Operations Richland, Washington	AC06-76RL02320
California, University of	Laboratory of Radiobiology and Environmental Health San Francisco, California	AC03-76SF01012
California, University of	Laboratory of Energy Related Health Research Davis, California	AC03-76SF00472
California, University of	Los Alamos National Scientific Laboratory Los Alamos, New Mexico	W-7405-ENG-36
California, University of	Laboratory of Biomedical and Environmental Sciences Los Angeles, California	AC03-76SF00012
California, University of	Lawrence Berkeley Laboratory Berkeley, California	AC03-76SF00098
California, University of	Lawrence Livermore National Laboratory Livermore, California	W-7405-ENG-48
Chicago, University of	Argonne National Laboratory Argonne, Illinois	W-31109-ENG-38
Computer Sciences Corp.	Computer Center Operations Las Vegas, Nevada	AC08-81NV10163
E.I. DuPont De Nemours & Co.	Savannah River Laboratory and Plant Aiken, South Carolina	AC09-76SR00001
EG&G Idaho, Inc.	Idaho National Engineering Laboratory Idaho Falls, Idaho	AC07-76ID01570
EG&G Inc.	Timing, Firing and Scientific Support Las Vegas, Nevada	AC08-83NV10282
Exxon Nuclear Idaho, Inc.	Idaho Falls Chemical Processing Plant Idaho Falls, Idaho	AC07-79ID01675
Fenix & Scisson, Inc.	Drilling and Mining Operations Las Vegas, Nevada	AC08-76NV00038
Garrett Corp.	Technical Support for Centrifuge Enrichment Torrance, California	AC05-760R02908
General Electric Co.	Knolls Atomic Power Laboratory Schenectady, New York	AC12-76SN00052
General Electric Co.	Pinellas Plant Jacksonville, Florida	AC04-76DP00656
Georgia Research Foundation, Inc., University of	Savannah River Ecology Laboratory Athens, Georgia	AC09-76SR00819
Goodyear Aerospace Corp.	Portsmouth Gaseous Diffusion Plant Piketon, Ohio	AC05-760R00001
Hanford Environmental Health Foundation	Occupational Health Services Richland, Washington	AC06-76RL01837
Holmes & Narver, Inc.	Architect-Engineer Services Las Vegas, Nevada	AC08-76NV00020

*Includes onsite service contracts

APPENDIX I

CONTRACTOR NAME	FACILITY OR SERVICE RENDERED AND LOCATION	CONTRACT NUMBER
Iowa State University	Ames Laboratory Ames, Iowa	W-7405-ENG-82
J. A. Jones Construction Service	Miscellaneous Construction Services Richland, Washington	AC06-76RL00687
Kaiser Engineers Hanford Co.	Architect-Engineer Services Richland, Washington	AC06-82RL10367
Lawrence-Allison Assoc.	National Petroleum Reserve #3 Casper, Wyoming	AC01-81RA32087
Leland Stanford Jr. University	Stanford Linear Accelerator Facility Stanford, California	AC03-76SF00515
Lovelace Biomedical	Inhalation Toxicology Research Institute Albuquerque, New Mexico	AC04-76EV01013
M-K National Co.	Construction Management Services Idaho Falls, Idaho	AM07-79ID01750
Mason & Hanger-Silas Mason Co.	Pantex Plant Amarillo, Texas	AC04-76DP00487
Midwest Research Institute	Solar Energy Research Institute Golden, Colorado	AC02-83CH10093
Monsanto Research Corp.	Mound Facility Miamisburg, Ohio	AC04-76DP00053
Mountain States Energy	MHD Component Development and Integration Facility Butte, Montana	AC07-78ID01745
National Lead Co. Ohio	Fernald Feed Materials Production Center Cincinnati, Ohio	AC05-76OR01156
Oak Ridge Associated Universities, Inc.	Manage and Operate Research and Training Facilities Oak Ridge, Tennessee	AC05-76OR00033
Princeton University	Princeton Plasma Physics Laboratory Plainsboro, New Jersey	AC02-76CH03073
Reynolds Electric and Engineering Co., Inc.	Weapons Test Support Services Las Vegas, Nevada	AC08-76NV00410
RMI Co.	Extrusion Plant Ashtabula, Ohio	AC05-76OR01405
Rockwell Hanford Operations	Hanford Production Operations Richland, Washington	AC06-77RL01030
Rockwell International Corp.	Energy Technology Engineering Center Canoga Park, California	AC03-76SF00700
Rockwell International Corp.	Rocky Flats Plant Golden, Colorado	AC04-76DP03533
Ross Aviation	Air Transportation Services Albuquerque, New Mexico	AC04-76DP03276
Rust Engineering Corp.	Construction Services Oak Ridge, Tennessee	AC05-79OR05663
Rust Engineering Corp.	Operation and Maintenance Services Oak Ridge, Tennessee	AC05-79OR06067
Science Applications, Inc.	Planning and Operation of Exhibits Program Oak Ridge, Tennessee	AC05-81OR20837
UNC Nuclear Industries	Management and Operations of N Reactor Richland, Washington	AC06-76RL01857
Union Carbide Corp.	Oak Ridge Gaseous Diffusion Plant, Oak Ridge National Laboratory, Paducah Gaseous Diffusion Plant, Y-12 Plant Oak Ridge, Tennessee	W-7405-ENG-26
Universities Research Assoc.	Fermi National Accelerator Laboratory Batavia, Illinois	AC02-76CH03000

APPENDIX I

CONTRACTOR NAME	FACILITY OR SERVICE RENDERED AND LOCATION	CONTRACT NUMBER
Wackenhut Services, Inc.	Security Guard Services Las Vegas, Nevada	AC08-81NV10101
Wackenhut Services, Inc.	Security Support Services Aiken, South Carolina	AC09-83SR11046
Western Electric Co., Inc.	Sandia National Laboratory Albuquerque, New Mexico	AC04-76DP00789
Westinghouse Electric Corp.	Nuclear Waste Research Pittsburgh, Pennsylvania	AC08-82NV10250
Westinghouse Electric Corp.	Bettis Atomic Power Laboratory West Mifflin, Pennsylvania	AC11-76PN00014
Westinghouse Hanford Co.	Hanford Engineering Development Laboratory Richland, Washington	AC06-77FF02170
Williams Brothers Engineering Co.	Naval Petroleum Reserve #1 Tupman, California	AC01-80RA32049
Zia Co.	Support Services Los Alamos, New Mexico	AC04-76DP00090

APPENDIX II

ADDRESSES OF DEPARTMENT OF ENERGY AWARDING OFFICES

Washington Operations Office
Forrestal Building, MA-45, Room 1I-066
1000 Independence Avenue, SW
Washington, DC 20585

Petroleum and Oil Shale Reserves Offices
800 Werner Court, Suite 342
Casper, WY 82601

Chicago Operations Office
9800 South Cass Avenue
Building 201, 3rd Floor
Argonne, IL 60439

Environmental Measurements Laboratory
376 Hudson Street
New York, NY 10014

Pittsburgh Energy Technology Center
P.O. Box 10940
Pittsburgh, PA 15236

Boston Support Office
150 Causeway Street
Boston, MA 02114

New York Support Office
26 Federal Plaza, Room 3206
New York, NY 10007

Philadelphia Support Office
1421 Cherry Street, Room 1001
Philadelphia, PA 19102

Chicago Support Office
9800 South Cass Avenue
Building 201, 3rd Floor
Argonne, IL 60439

National Waste Terminal Storage Program Office
505 King Avenue
Columbus, OH 42301

Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87115

Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

Kansas City Area Office
P.O. Box 202
Kansas City, MO 64141

Dallas Support Office
P.O. Box 35228
Dallas, TX 75235

Kansas City Support Office
324 East Eleventh Street
Kansas City, MO 64106

Oak Ridge Operations Office
P.O. Box E
Oak Ridge, TN 37830

Clinch River Breeder Reactor
Plant Project Office
P.O. Box U
Oak Ridge, TN 37830

Grand Forks Project Office
P.O. Box 8213, University Station
Grand Forks, ND 58202

Laramie Project Office
P.O. Box 3395, University Station
Laramie, WY 82071

Morgantown Energy Technology Center
P.O. Box 880
Morgantown, WV 26505

Strategic Petroleum Reserve Project
Management Office
900 Commerce Road, East, U.S. 492
MS EP-55040
New Orleans, LA 70123

ADDRESSES OF DOE AWARDING OFFICES (Cont'd)

San Francisco Operations Office
1333 Broadway
Oakland, CA 94612

Bartlesville Project Office
P.O. Box 1398
Bartlesville, OK 74003

Idaho Operations Office
550 Second Street
Idaho Falls, ID 83401

Grand Junction Area Office
P.O. Box 2567
Grand Junction, CO 81502

Denver Support Office
P.O. Box 26247, Belmar Branch
Lakewood, CO 80226

Nevada Operations Office
P.O. Box 14100
Las Vegas, NV 89114

Savannah River Operations Office
P.O. Box A
Aiken, SC 29801

Atlanta Support Office
1655 Peachtree Street, NE
8th Floor
Atlanta, GA 30309

Pittsburgh Naval Reactors Office
P.O. Box 109
West Mifflin, PA 15122

Schenectady Naval Reactors Office
P.O. Box 1069
Schenectady, NY 12301

Western Area Power Administration
P.O. Box 3402
Golden, CO 80401

Southwestern Power Administration
P.O. Box 1619
Tulsa, OK 74101

Southeastern Power Administration
Samuel Elbert Building
Elberton, GA 30635

Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

Alaska Power Administration
P.O. Box 50
Juneau, AK 99802

Richland Operations Office
P.O. Box 550
Richland, WA 99352

Policy Analysis

Question: Provide a list of all policy and system studies to be performed under contract in FY 84 and FY 85 with funding levels.

Answer: Policy and system studies to be performed under contract in FY 1984 are as follows:

> Natural Gas - A continuation of the 2-market model of the domestic natural gas market for analytical studies in legislative proposals; analyses of fuel consumption in the industrial sector, review of industrial fuel use and gas demand behavior; and detailed analysis of downstream efficiency and reform of regulations - $400,000;
>
> Oil - Studies in recent structural changes in the world oil market; develop new refinery model for Contingency Planning Model (CPM) and estimate trends in new refinery capacity investments on West Coast - $160,000;
>
> Energy Security - Studies concerning short-term economic effects of disruption and effects of IEA Sharing agreement on world oil prices; continuation of analysis of incentives for countries to drawdown or hold on to petroleum stockpiles during early stages of a disruption - $240,000;
>
> Projections/Energy Models - General projections support and energy models relating to disruptions, energy demand and utility projections - $400,000;
>
> Electricity - Comprehensive review of Canadian electricity imports; studies on power pooling; evaluation of utility conservation programs and analysis of trends in load factors and management programs - $400,000;
>
> Coal - Analysis of the coal leasing program; economic analysis of coal transportation; and export coal competition assessment - $450,000;
>
> Tax and Finance - Analysis of comprehensive tax reform proposals and effect of federal taxation on new electric generating capacity - $200,000;
>
> Nuclear Energy and Energy Technology - Studies of potential role of smaller, modular nuclear reactors; energy technology industry studies; assessment of federal/private roles in energy technology; and assessment of industry's views of R&D needs - $500,000;
>
> Regulation and Information - Review CAFE standards; analysis of appliance information, auto misfueling and costs of environmental compliance - $150,000;

Energy Sector - Analysis of energy aspects of industrial policy, concumser response to price and economic incentives and changing fuel demand in industrial and residential sectors - $150,000;

Macroeconomic and Energy Issues - Analysis of trends in energy use, economic efficiency of alternatives for meeting future energy demand and studies supporting the National Energy Policy Plan - $300,000; and

Strategic Planning - Studies supporting strategic program planning and modification of environmental models - $150,000.

For FY 1985 the Office of Policy, Planning and Analysis (PPA) will be reviewing staff work plans for contract funds in the near future. It is, however, anticipated that the levels of funding and the analyses and studies by contractors will continue in the manner indicated above for FY 1984. The increase of $1,000,000 in policy studies from FY 1984 will provide for additional work needed in the area of Canadian electricity imports, new studies in the areas of emergency preparedness, the environment, coal development and synfuels.

Question: Provide a more detailed explanation for all additional studies to be initiated in FY 85 with the $1 million funding increase.

Answer: The Office of Policy, Planning and Analysis will begin staff work plans for FY 1985 in the near future. The studies and additional funds needed for FY 1985 are as follows:

Electricity - More contract funds will be delegated to the comprehensive analytical effort in the area of Canadian electricity imports and economic evaluation of expanded electricity wheeling, issues which we believe will receive Congressional attention - $200,000;

Natural Gas and Oil - Update the domestic oil and gas supply models, review economics of drilling in mature U.S. oil and gas basins, analyze effects and use results to update supply models; study on government's response to panic in supply disruption; and estimate market power of major interstate pipelines - $200,000; and

Emergency Preparedness - Expanded studies in the area emergency preparedness which will be required in response to legislative issues - $200,000;

National Energy Policy Plan - Analysis of energy use and future energy demand and studies to support the fifth National Energy Policy Plan - $300,000.

Any remaining funds would be held for studies and analyses required for requests from the Congress or the President which have not yet been identified on the legislative calendar for FY 1985.

Congressional, Intergovernmental and Public Affairs

Question: Please explain your efforts over the last four years to reduce the Congressional, Intergovernmental and Public Affairs budget and staff. Provide a detailed breakdown, particularly of the program direction portion.

Answer: During the last four years, I have made a concerted effort to streamline the programs and management of the Office of Congressional, Intergovernmental and Public Affairs (CP). In the last Administration, there were over 350 employees in the six offices which are now CP. Since FY 1980, I have cut staffing 44 percent, from 233 to a current level of 130 full-time equivalent staff years. Based on a major reorganization, I was able to cut unnecessary functions and through better utilization of staff resources still have the capability to perform those activities that are mandated by legislation.

For example, in the prior Administration, there was only a minimal communication management program in the Department. Spending had skyrocketed on exhibits, films, and public relations campaigns which, in many cases, did not reflect a focused, balanced energy program. Through more careful and focused planning, we have developed a workable management control system which is in keeping with President Reagan's efforts on waste and inefficiency in publishing and audiovisual programs. Agencywide we have cut $11 million in unnecessary DOE films and exhibits and saved approximately $3 million on unnecessary or duplicative publications. In the Public Affairs area, we have moved from an office that developed and published energy information to a policy-oriented office which now reviews proposed publications and audiovisual activities to ensure that they reflect a balanced energy program and do not duplicate publications/audiovisuals already available.

While I have made a significant reduction in funding and staff in the Office of Consumer Affairs, we are continuing to build partnerships with organizations that work for constructive and creative solutions to the Nation's energy needs. I think you will agree that it is the Department's responsibility to promote a balanced energy policy, and I am proud to say that I have instituted such a public program. Additionally, staffing has been reduced in Intergovernmental Affairs and Competition; yet we have continued to carryout the most essential activities.

Issues relating to the Department of Energy continue to be of great interest to the Congress. In our Congressional Affairs area, we have no fewer than 27 committees, 53 subcommittees, plus House and Senate Appropriations Committees, that have some jurisdiction over the Department. We have maintained an excellent staff to continue to support the needs of all Representatives and Senators as well as their staffs and to provide them with needed information in a timely and efficient manner.

Budget authority for CP activities since FY 1980 is summarized in a table which I would like to insert for the record.

Budget Authority
(Dollars in Thousands)

	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984
Program Direction	$ 9,093	$ 8,486	$ 6,799	$ 6,354	$ 6,431
Program Support	4,333	4,452	400	303	150
Total BA	$13,426	$12,938	$ 7,199	$ 6,657	$ 6,581

Office of Competition

Question: Your request includes $100,000 for competition, a new line item in the budget justification material. Please explain the purpose and need for this item.

Answer: The Office of Competition provides analysis on competition for the Department as required by the DOE Organization Act and by the Supreme Court's requirement that antitrust principles be made a part of the consideration of the public interest. The Office consists of a small group of antitrust lawyers and industrial organization economists who focus their attention on the competitive impact of DOE's actions and policies on the energy industries.

In the past, with a professional staff of about ten, the Office undertook a wide variety of tasks. Today, with only four professionals the focus is more on deregulation activities, and some necessary and worthwhile projects can only be accomplished through the use of contractor support. The $100,000 requested for FY 1985 will provide such support, fund data processing services, pay for transcripts of regulatory proceedings, etc. Prior year unobligated funds are being used to fund such expenses in FY 1984, but new authority will be essential for FY 1985.

Merger

Question: Your FY 1984 budget request was based on the assumption that reorganization or merger would occur. Is any portion of the FY 85 budget based on a similar assumption?

Answer: The FY 1985 budget is not based on any assumptions regarding reorganization or merger.

International Affairs

Question: Provide the committee with additional justification for the $1 million increase from FY 1984 allocated to International Policy Studies.

Answer: This Administration feels that limiting the proliferation of nuclear weapons is vitally important, and that the Nuclear Nonproliferation Treaty is the basis of the world's nonproliferation commitments. In 1985, parties to the treaty will hold a major review conference at which one of the primary topics, along with nuclear disarmament, will be the identification of just how the nuclear powers are working to assist the developing world to benefit from nuclear energy, particularly non-power applications in medicine, agriculture and the like. This assistance was promised under Article IV of the Treaty and some countries have openly stated that the developed nations have not kept the promises they made in urging that all nations sign the Treaty.

In order for the United States to demonstrate its commitment to the obligations it assumed when it signed the Treaty, and to try to convince other nations to become parties, we intend to demonstrate the wide variety of programs and projects we have supported in the past and to identify new low-cost initiatives that may be suitable as incentives for new countries to accept the Treaty, and for present countries to continue to remain parties to the Treaty. The request for additonal FY 85 policy study funds is for the purpose of identifying and cataloging our past efforts, and for identifying and developing new initiatives that the U.S. may be able to present at the Review Conference.

In the area of International Energy Market Analysis additional contracting funds are required to support more frequent and indepth analyses and evaluations of key aspects of international energy markets.

Such analyses are essential to assisting the Office of International Energy Policy Analysis and Integration in monitoring critical trends in international energy markets and assessing their impacts on the U.S. energy market.

Key areas meriting contractual support are:

-- changes in oil inventory behavior, minimum operating levels and their potential impact during oil supply disruptions;

-- the development of downstream (refineries and petrochemical plants) processing capabilities in the producing countries and their impact on refinery economics and import patterns of oil consuming countries;

-- worldwide natural gas development prospects, alternatives to Soviet gas imports, and future LNG trade patterns;

-- energy consumption trends in both the industrialized and developing countries to determine the impacts of structural change on future energy demand;

-- changes in international oil contractual arrangements, including the increased use of short-term contract arrangements, and their impact on international energy security;

-- U.S. energy trade prospects in coal, gas and uranium enrichment and impediments to expanded U.S. exports.

These studies will provide critical analytical input into ongoing evaluations of the structure of energy markets and their implications for energy security.

SUBCOMMITTEE RECESS

Senator JOHNSTON. The committee will recess until March 6 at 2 p.m. in this room for review of solar and renewal of programs of DOE.

[Whereupon, at 11:55 p.m. Thursday, March 1, the subcommittee was recessed to reconvene at 2 p.m. on March 6.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

TUESDAY, MARCH 6, 1984

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:05 p.m. in room SD–192, Dirksen Senate Office Building, Hon. Mark O. Hatfield (chairman) presiding.

Present: Senator Hatfield.

DEPARTMENT OF ENERGY

SOLAR AND RENEWABLE ENERGY PROGRAMS

STATEMENTS OF:

WILLIAM PATRICK COLLINS, UNDER SECRETARY AND ACTING ASSISTANT SECRETARY FOR CONSERVATION AND RENEWABLE ENERGY

DONNA R. FITZPATRICK, PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR CONSERVATION AND RENEWABLE ENERGY

DR. ROBERT L. SAN MARTIN, DEPUTY ASSISTANT SECRETARY FOR RENEWABLE ENERGY

OPENING REMARKS

Chairman HATFIELD. The hearing will come to order. This afternoon we continue our examination of fiscal year 1985 budget request for the Department of Energy. The purpose of this hearing is to receive testimony on the budget request for solar and other renewable programs and certain environmental and safety activities. On behalf of the subcommittee, I welcome William Patrick Collins, Under Secretary and Acting Assistant Secretary for Conservation and Renewable Energy, and Jan W. Mares, Assistant Secretary for Policy, Safety, and Environment.

PREPARED STATEMENT AND BIOGRAPHICAL SKETCH

Mr. Collins, your entire statement will be placed in the record, and if you wish to proceed to highlight or to summarize, I will be very happy to hear from you at this time.

[The statement and biographical sketch follow:]

STATEMENT OF WILLIAM PATRICK COLLINS

Mr. Chairman and Members of the Subcommittee, I appreciate this opportunity to appear before you today and provide information on the FY 1985 budget request concerning the Department's Renewable Energy, Electric Energy Systems and Energy Storage programs. The budget for these programs was developed in concert with the Fourth National Energy Policy Plan (NEPP-IV), published in October 1983, and fully supports the goals and strategies set forth in that document. I will summarize those parts of the Plan which are relevant to the subject of today's hearing and discuss related highlights of the FY 1985 budget request.

NATIONAL ENERGY POLICIES AND STRATEGIES

The goal of national energy policy is to foster an adequate supply of energy at reasonable costs. An adequate supply requires a flexible energy system that avoids undue dependence on any single source of supply, foreign or domestic, and thereby contributes to our national security and economic stability. The strategies for achieving this goal include:

- Minimizing federal control and involvement in energy markets while maintaining public health, safety and environmental quality, and
- Promoting a balanced and mixed energy resource system.

Renewable energy resources can play an important role in reaching a balanced and mixed energy supply system. Renewables offer supply diversity, modularity of system sizes, and flexibility in meeting a variety of end use demand. Collectively, their modularity and flexibility in direct thermal applications, bulk electricity supply, or in meeting requirements for liquid and gaseous fuels, makes them highly attractive alternatives for private sector development and deployment. As technological advances improve renewable technology viability, there will be increased diversity within the nation's future energy supply infrastructure and an increase in competition within the energy marketplace. The federal strategy for renewable energy R&D is to concentrate on scientific and engineering research which will lead to a better understanding of: the characteristics of renewable energy resources; the mechanisms for converting these resources to more useful energy forms; and the materials to ensure that the systems can achieve the necessary reliability and efficiency.

An example of the progress made to date can be seen in photovoltaics. Multi-layered cell research has advanced from its initial conceptualization in 1980, to achievement of recently attained 22 percent experimental efficiency. Equally important is the fact that research at the Solar Energy Research Institute (SERI) and at industrial laboratories has significantly increased understanding of the basic photovoltaic effect. Today, scientists and engineers openly debate the most suitable concepts to reach conversion efficiencies of 35 percent, a figure not considered realistic three years ago.

The program presented for your review today represents a sound and stable commitment to the continuing development of these technologies. We are confident that these proposals will increase understanding of the potential for virtually all of the most promising options within renewable energy and will substantially contribute to the base of technical information required for informed decision making regarding renewable energy.

Especially important is the Department's proposal to increase its emphasis on technology transfer activities. Through these activities the Department intends to gain additional insights into industrial research priorities early in the federal planning process and improve upon an already effective technical information program in order to better provide timely knowledge to interested parties in a form responsive to their specific needs.

The FY 1985 budget request for Renewable Energy, Electric Energy Systems and Energy Storage programs is $226 million. For comparison purposes, last year's request was $129 million for these programs. (See attachment).

I would now like to address the funding requests for selected major programs.

SOLAR BUILDING ENERGY SYSTEMS

Solar building energy technologies employ direct and indirect solar radiation to provide heating, cooling, and natural lighting for buildings. The FY 1985 budget request for Solar Building Energy Systems is $11.9 million. These funds will be used to conduct R&D activities in support of industry development of low and medium temperature solar collector concepts and construction techniques that can result in reduced energy requirements for buildings.

The Department is requesting $7.2 million for Materials and Components Research to develop and test light-weight materials for use in low-cost, durable nonmetallic collectors. Research will also be undertaken on cost effective solar absorption and Rankine cooling technologies. Glazing materials that transmit solar energy, but resist heat losses, will also be studied. When used for windows, these materials have the potential to significantly reduce cooling loads, prevent overheating, and provide improved natural lighting to interior building spaces. Testing will be conducted on thermal storage materials that offer properties of low weight and durability, and are suitable for building materials or components.

In Heat Transfer Systems Analysis, the Department is requesting $3.2 million for research to better define performance of solar systems. One-of-a-kind components will be tested and evaluated to identify the most promising and effective design approaches. Within this area, passive solar techniques for non-residential structures will be examined to further understand natural heat distribution systems, to determine the impact of building space conditioning loads upon utility demands, and to assess the effectiveness of alternative cooling and lighting technologies. The capability to fully utilize available natural light will be assessed under various climate conditions in conjunction with new lighting techniques.

Finally, in Thermal Science Research, $1.3 million is requested to conduct research to identify and evaluate promising innovative concepts for solar heating and cooling. In particular, research will be conducted on cooling processes such as evaporation and ventilation to determine the limits of these concepts for effective cooling of buildings.

PHOTOVOLTAIC ENERGY SYSTEMS

Photovoltaic technology directly converts solar radiation to an electric current. The FY 1985 budget request is $47.5 million to continue the development of a technology base from which private enterprise can select and develop competitive applications for electrical energy markets.

The Department proposes $31.0 million for Materials Research to overcome the technical barriers currently limiting the efficiency and cost of photovoltaic cells. The work will focus on single-layer thin film cells, new high-efficiency techniques, silicon sheets and innovative concepts. For single-layer thin film cells, research will concentrate on increasing cell efficiency, with a goal of achieving 15 percent efficiency, as well as continuing to improve cell stability and lifetime. Photovoltaic cells made of thin film materials offer the potential for reducing material requirements and lowering production costs through the use of automated manufacturing processes.

Advanced high-efficiency techniques will focus on the development of multi-layered photovoltaic cells. These cells offer the potential to achieve very high conversion efficiencies of up to 35 percent. Activities in this area will include the fabrication of multiple cells through the layering of different materials so that each layer converts a different portion of the solar light spectrum into electricity.

DOE proposes to fund research to address those remaining key issues which currently preclude full scale automated production of silicon. Automated silicon production technology may overcome the low yield and quality control problems inherent in state-of-the-art production technologies. Additionally, the Department is proposing to upgrade the capabilities of the Device and Measurement Laboratory at SERI, a worldleading research center which evaluates 500 to 1000 photovoltaic cell materials per year.

The Department proposes to compliment the previously described materials research activities with an innovative concepts and university research program that draws upon the creative genius of the nation's universities, private research laboratories, and small businesses. Funds will be provided for the best new ideas proposed by these organizations to conduct research to determine the R&D potential of new materials or innovative concepts for photovoltaic devices.

The Department requests $10.5 million for Collector Research to improve the efficiency and durability of both flat plate and concentrator modules. Flat plate collector research will result in increasing the efficiency of crystalline silicon cells through the development of improved coatings and low-cost electrical conductors. Concentrator collector research will be focused on the development of cells which can potentially achieve efficiencies of 20 to 23 percent in concentrated sunlight.

The Department requests $5.0 million in Systems Research to better define remaining photovoltaic reliability and life expectancy issues. A variety of

PV modules will be tested under different operating and environmental conditions. Lessons learned, such as how to avoid electrochemical corrosion, improve voltage insulation, and prevent high voltage failure through improved circuit designs will be transferred to industry for further development and verification.

SOLAR THERMAL ENERGY SYSTEMS

Solar thermal technology employs concentrated sunlight to produce heat, electricity or both. The FY 1985 budget request for the Solar Thermal Energy Systems program totals $37.5 million. Innovative solar thermal concepts will be investigated to develop high performance, reliable solar energy systems that are cost competitive for electric and process heat applications.

The Department is requesting $8.9 million for Materials and Component Research. Experiments will be conducted to define the physical properties of potential heat transfer materials such as molten salts for solar thermal receivers and storage devices. Materials which may reduce the cost and weight of solar concentrators will be developed and evaluated. Finally, the materials used for receiver, delivery, and storage devices will be evaluated to determine their suitability for operating within a high temperature environment.

The request of $4.5 million for Concentrator Research and Development will be used to develop potentially low-cost, high performance concentrator concepts. Scale models will be tested and system analyses will be conducted to identify tradeoffs among collector performance, spacing, and cost of the various alternatives.

The $16.5 million requested for Central Receiver Research and Development will be used to examine concepts that show promise of attaining the substantial performance gains expected if solar thermal technology can be developed to operate at temperatures in excess of 1500°F. Advanced control concepts will be evaluated at the Central Receiver Test Facility and the power production phase of the Barstow 10 MWe Central Receiver Pilot Plant will be initiated.

In Distributed Receiver Research and Development, the Department requests $7.1 million to sponsor a one time cost-shared activity to design, build and evaluate first generation Stirling and Brayton engines. The results of this experiment should provide a sufficient technical basis for industry to determine the development potential of solar dish to electricity technology. A variety of other supporting research aimed at resolving critical distributed receiver engineering issues, including the operation of the Distributed Receiver Test Site, will also be undertaken in FY 1985.

BIOFUELS ENERGY SYSTEMS

Biofuels technologies are potentially capable of converting various feedstocks, such as forest wastes, animal wastes, and agricultural residues into liquid, gas, or solid fuels. The total biofuels request of $28.1 million will be evenly balanced between feedstock development and the continuing evaluation of promising conversion technologies.

The Department is requesting $4.2 million for Short Rotation Intensive Culture research. Research has shown that productive yields may be obtainable for certain species of woody biomass such as hybrid poplar and black cottonwood through the use of advanced agricultural methods. Expecially important, the Department plans to fund a new genetics program to develop wood resources with high yields, improved resistance to pests and disease, lower nitrogen or water requirements, and improved energy characteristics such as higher Btu content or lower moisture content.

The Feedstock Production request is $6.2 million. Research to better define the energy potential of crops that can be grown on grasslands or in water will be performed. As part of this research the Department will identify and improve herbaceous crops which have the potential of being grown on marginal lands. In addition, research will be conducted to improve oil content, increase growth rates, and to determine methods for harvesting microalgae as an energy resource.

The $7.0 million request for Thermochemical Conversion is for research to improve processes for converting biomass into liquid fuels and gas. Tests on various conversion concepts such as gasifiers and thermochemical reactors will be conducted to better understand their operation. Research and development will be conducted to improve the technology for using municipal waste as a fuel within acceptable environmental constraints. Research will also be conducted to evaluate various techniques for converting wood to liquid fuels.

The Department is requesting $6.6 million for Biochemical Conversion. Research will include investigations of biochemical reactions which can produce ethanol from various feedstocks. A major technical milestone will be accomplished when a 25 ton per day experiment begins operation as a technical baseline for acid hydrolysis of biomass. Improved methods for alcohol/water separation and for anaerobic digestion of feedstocks will be evaluated under laboratory conditions. The Refuse-Conversion-to-Methane (Refcom) facility at Pompano Beach will also be operated to evaluate methane production from a combination of sewage sludge and municipal solid waste.

The Department requests $3.1 million to fund the Regional Biomass Program which serves as a focal point for biofuels technology transfer activities. These regional programs will provide regional-specific information concerning biomass feedstock resources, feedstock conversion technologies and potential end-use applications to localities and industry in a form suited to their needs.

WIND ENERGY SYSTEMS

Wind energy involves the conversion of the energy of moving air into more useful forms, such as electricity. The Department requests $23.3 million to continue development of the technology base to support industry development of cost-effective and durable wind conversion technologies.

For the $8.8 million requested in Aerodynamics Research, an improved understanding of the essential interaction between wind turbine airfoils and the wind will be gained. The performance of wind machines under actual operating conditions and in different environments will be evaluated. Airfoil shapes and operating strategies which may improve the long-term performance of wind machines will also be analyzed and tests will be conducted at windfarms to determine how the location of multiple wind machines influences the performance of each individual machine.

DOE requests $7.7 million for Structural Dynamics research to improve the ability of industry to accurately predict structural loads. The structural performance of commercial and the DOE MOD-2 wind machines will be carefully monitored and evaluated to determine the natural resonant frequencies of modern wind machine designs. Samples of materials commonly used for wind machine blades, such as wood/epoxy, fiberglass, and aluminum, will be tested to determine the potential durability of these materials in different operating conditions.

The $1.7 million request for the Small Systems Test Center at Rocky Flats will provide testing and engineering support to industry. Analytical tools and design information developed through the Rocky Flats testing program will be provided to manufacturers, windfarm users, universities, and utilities.

The Department intends to complete its portion of the MOD-5B design and evaluation process under the FY 1985 request of $4.2 million.

OCEAN ENERGY SYSTEMS

Ocean energy technology involves the extraction of energy from ocean waves, currents, tides, and salt or thermal gradients. The FY 1985 budget request of $3.5 million will be focused on understanding ocean thermal energy conversion (OTEC) systems for generation of electrical power.

The $1.0 million request in Materials and Structures Research will center on the development of materials that can withstand the severe ocean environment. Fiberglass reinforced plastic pipe will be tested to determine its fatigue parameters. Techniques for installation of safe and secure OTEC components in the rugged ocean environment will be developed and tested.

The $1.4 million for Thermodynamics Research and Analysis will support a variety of research to improve the understanding of thermal stress and fatigue, and improvements in OTEC heat exchangers to increase overall efficiency of this critical component.

In Experimental Verification and Testing, $0.6 million will fund the development and experimental verification of generic computer models at the Seacoast Test Facility.

The $0.5 million request for Environmental and Oceanographic Research will be used to study the impact of the extraordinary large water requirements for OTEC systems. Changes that may occur in the environment as related to the siting of OTEC systems will be evaluated within the DOE request.

INTERNATIONAL SOLAR ENERGY

The International Solar Energy Program serves to assist U.S. industry in conveying the technical quality of their products to potential foreign users. The FY 1985 budget request is $0.5 million.

The Department of Commerce will be funded to enter into cost-sharing agreements with industry to provide for international exposure of American solar technology at foreign expositions and other trade events. Additionally, domestic seminars will be conducted to enable U.S industry to better understand international trade opportunities and the best methods for offering U.S. technology abroad.

SOLAR TECHNOLOGY TRANSFER

DOE considers technology transfer a two-way process through which industrial priorities are considered early in the federal planning process and which provides a mechanism to transfer research results, experiences and "lessons learned" to groups and individuals within the private sector research and manufacturing communities. Thus, technology transfer is a vital link between the public and private sectors in the research and development process. The program request for FY 1985 is $6.0 million.

The Departmental request of $3.2 million for Solar Technical Information and Mandated Reports will provide for continuation of the SERI technical information program and the preparation of reports mandated by law.

The Department is requesting $2.2 million for the continued operation of the Conservation and Renewable Energy Inquiry and Referral Services (CAREIRS) which provides general information to the public concerning conservation and renewable energy technologies. CAREIRS also provides referrals to appropriate organizations or publications for persons who request detailed technical information.

The request of $0.4 million for Technology Transfer Assessments will be used to evaluate in cooperation with industry innovative technology transfer methods for improving information flow between the public and private sector. A variety of methods including seminars, workshops, conferences, cooperative research projects, cost-sharing, fee-paid user test facilities, and technology transfer centers will be reviewed and evaluated.

A series of Seminars and Workshops will be funded with the Departmental request of $0.2 million. These forums will ensure that an open and meaningful dialogue is maintained between the DOE and the private sector.

GEOTHERMAL

Geothermal energy involves the direct use of the natural heat of the earth and its conversion to other useable energy forms. The FY 1985 budget request of $27.1 million will allow continuing resolution of technical barriers to the use of geothermal resources.

The $3.5 million request for Geopressured Resource research will allow continued testing of Gulf Coast geopressured production wells to better quantify the potential of this resource. The Department also proposes to develop, install and evaluate a wellhead electric generator suited for operating at this type of geothermal well in cooperation with industry.

The $5.5 million request for Hot Dry Rock research at Fenton Hill will provide a basis for verifying the potential of this geothermal energy extraction technique. The feasibility of constructing a multiple-fracture, large scale reservoir with a project life of at least ten years will be specifically evaluated.

The Department requests $9.9 million for Hydrothermal research activities to address injection of unuseable geothermal waters, define reservoir characteristics, and conduct heat cycle research materials testing at the Geothermal Test Facility. Especially important, DOE will fund the drilling of a very deep hydrothermal well to examine the characteristics of deep hot water reservoirs to better define the potential of this form of geothermal energy. Mapping techniques will be field tested to locate natural fracture systems within hot water reservoirs to provide a better basis for defining this resource potential. The feasibility of tapping potential hydrothermal reservoirs associated with volcanic craters of the Cascade Range will also be evaluated under the Department's FY 1985 request.

The $4.4 million request for Hard Rock Penetration research includes tests on new drilling bits and the development and field-testing of a prototype advanced drilling system on a cost-shared basis with industry. The $1.4 million request for Magma Energy Extraction research will include the identification of reservoirs suitable for the extraction of energy from molten rock and evaluation of materials that can operate in the harsh magma environment.

In geothermal Technology Transfer, the request of $1.0 million will be used for a variety of activities including conferences, seminars, publicatons, and cooperative technology reviews to improve knowledge sharing with the geothermal research, development and industrial community.

HYDROPOWER

Small scale hydropower is a comparatively mature technology that uses the nation's streams and smaller waterways as an energy source to produce electrical power. The FY 1985 budget request is $0.5 million. The DOE program will focus on monitoring a number of hydropower projects funded through prior years and transferring the results of those projects to the non-federal community.

GEOTHERMAL RESOURCE DEVELOPMENT FUND

The Geothermal Resource Development Fund (GRDF) was established to broaden the geothermal energy technology base through guarantying risk capital for private sector development of several state-of-the-art facilities. The $0.1 million budget request allows for evaluation of pending loan applications, restructuring of existing guaranty agreements and monitoring outstanding loans.

ENERGY STORAGE

The Energy Storage Technologies (EST) program serves as the nucleus for virtually all research activities related to energy storage within the Department of Energy. The program conducts research on energy storage technologies to support the private sector development of efficient, reliable, economic, safe, and environmentally acceptable energy storage systems. The FY 1985 budget request for the Energy Storage program is $17.1 million.

The $14.9 million Battery Storage activity consists of technology base research and exploratory technology development and testing. The technology base research activities encompass fundamental research with the overall objective of providing the basis for improvements in existing battery systems and the identification and development of new battery and fuel cell systems. Objectives of the exploratory technology development and testing activity include development and evaluation of high-performance, long-life, economical, and producible batteries for future mobile and stationary energy storage applications.

Two aims of the technology base research are to imporve materials and components of cells and batteries and to understand selected electrochemical phenomena, including corrosion. Experience has shown that materials limitations within electrochemical systems are the principle cause for failing to meet established system-performance goals. Improved materials and components will lead to improved energy efficiency, lower capital cost, and increased cycle life, energy, and power density of electrochemical devices.

In FY 1985, the exploratory technology development and testing activities will concentrate on sodium-sulfur and zinc-bromine batteries, as well as battery testing and post-test analysis of other types of batteries. The sodium-sulfur battery has the potential for the highest performance of any of the battery systems currently in the exploratory development phase. This battery appears capable of providing five times the energy storage capability per unit of present commercial lead-acid batteries. In addition, this battery appears capable of higher efficiency of operation. Program activities will emphasize continued development of cells with improved life and reliability.

The $1.3 million Thermal and Mechanical Energy Storage activity includes two major types of sub-activities: thermal energy storage and chemical (hydrogen) storage. The aims of the project are to develop low cost thermal chemical heat storage components. In the thermal storage area, activities will emphasize thermal/clathrate systems as well as form-stable phase change materials. Chemical/hydrogen activities will focus on developing efficient, cost competitive processes for producing hydrogen from water (high and medium temperature electrolysis) and providing the technology for safe and cost-effective storage, transmission, and distribution of hydrogen.

ELECTRIC ENERGY SYSTEM

The Electric Energy Systems program supports research aimed at: (1) determining the biological health effects and risks to humans exposed to high-voltage electric fields; (2) providing options that will enhance reliability of the nation's electric networks under all normal and emergency situations; and (3) improving the efficiency of electric systems through new materials, advanced controls, and new design concepts. The FY 1985 request for Electric Energy Systems is $18.2 million.

The Electric Fields Effects Research request is $3.7 million to provide biological data on electric field exposure and determine methods for extrapolating data from tissue and cell studies and from laboratory animal experiments to human effects. Efforts will be increased to determine the mechanisms by which electric fields interact with biological materials and provide a method for human effects analysis. The use of high voltage direct current (dc) transmission is rapidly growing in the U.S., but a major unknown is the impact of dc ions on living organisms. Recent articles in the popular press tie certain forms of cancer to magnetic field exposure. Public concern is growing and research will be initiated to assess the validity of this concern.

The $4.5 million Reliability Research activity will be expanded in FY 1985 in order to: (1) assess the impact of a nuclear electomagnetic pulse (EMP) on the Nation's electric network; (2) develop computer-aided technologies to enhance the reliability of electric power systems during normal and abnormal operation; (3) continue to develop more effective operating strategies for electric systems under stress, with computer-aided methods for problem recognition, analysis, and corrective action alternatives.

A total of $9.3 million has been proposed for Systems Technology to increase the efficiency and effectiveness of the nation's electric utility networks. The superconducting transmission cable project will examine new insulating materials for use at ambient temperatures. High voltage direct current (HVDC) transmission may be an alternative to alternating current lines for the transfer of bulk power. Research will be increased on this method of power transmission. Increased activity is also being proposed in the exploratory development of materials for future components and systems. These will include electrical insulating materials, magnetic conducting materials, and power semiconductor materials. This research will concentrate on understanding the basic molecular structure and will attempt to tailor materials more nearly to their use. The objectives of this research are improved efficiency (reduced losses), higher reliability, lower cost, and providing the technology base required to enhance productivity and to maintain technologial leadership.

CONCLUSION

Overall, the budget submitted for Fiscal Year 1985 represents a balanced and objective approach to sustaining the momentum achieved in renewable energy development. The balanced research and development program includes public and private cooperation and effective technology transfer efforts to enhance the national ability to define, develop and implement renewable energy technologies. Their development is consistent with the goals and objectives of the Fourth National Energy Policy Plan.

I thank you for the opportunity to make this presentation today.

U.S. DEPARTMENT OF ENERGY FY 1985

Renewable Energy - Electric Systems and Energy Storage Programs
(Budget in $000s)

	FY 1984 Budget Request	FY 1984 Appropriations	FY 1985 Budget Request
SOLAR ENERGY			
Solar Building Energy Systems	$ 10,450	$ 16,450	$ 11,885
Photovoltaic Energy Systems	32,700	50,400	47,500
Solar Thermal Energy Systems	11,500	43,850	37,500
Biofuels Energy Systems	17,300	28,400	28,100
Wind Energy Systems	8,600	26,500	23,300
Ocean Energy Systems	0	5,500	3,500
International Solar Energy Prog.	0	500	500
Solar Technology Transfer	3,100	3,250	6,000
Program Support	0	800	500
Program Direction	3,009	6,000	4,864
Subtotal - Solar Energy	86,659	181,650	163,649
GEOTHERMAL ENERGY			
Hydrothermal Industrialization	0	2,000	0
Geopressured Resources	0	5,000	3,500
Geothermal Technology Development			
Hot Dry Rock	5,040	7,540	5,500
Hydrothermal Research	4,434	11,334	10,056
Hard Rock Penetration	2,640	2,640	4,600
Magma Energy Extraction	845	845	1,400
Geothermal Technology Transfer	100	100	1,000
Program Direction	494	1,000	1,031
Subtotal - Geothermal	13,553	30,459	27,087
HYDROPOWER			
Small-Scale Hydropower Development	0	500	375
Program Direction	0	250	72
Subtotal - Hydropower	0	750	447
Subtotal - Renewable Energy R&D	100,212	212,859	191,183
ELECTRIC ENERGY SYSTEMS	12,702	18,500	18,232
ENERGY STORAGE	14,200	25,700	17,103
TOTAL - Energy Supply R&D	127,114	257,059	226,518
GEOTHERMAL RESOURCES DEVELOPMENT FUND (GRDF)	2,100	2,100	121
GRAND TOTAL	$129,214	$ 259,159	$ 226,639

BIOGRAPHICAL SKETCH OF PAT COLLINS

Pat Collins was nominated by the President on June 21, 1983, and confirmed on August 5, 1983, as Undersecretary of the U.S. Department of Energy (DOE).

Prior to joining DOE, Mr. Collins served as director of political affairs (1979–80), and vice president of political affairs (1981–83) at the National Association of Home Builders. From November 1980 to January 1981 he was assistant to the senior advisor, Office of Executive Branch Management, Reagan Presidential Transition Team.

Mr. Collins was Administrative Assistant to Montana Congressman Ron Marlenee (1976–79), and Legislative Assistant to Texas Congressman Alan Steelman (1973–76). He was associated with the government relations and political consulting firm of Raymond V. Humphreys Associates during 1971–72.

Mr. Collins entered the military as a private in 1968. After graduating from Infantry Officers Candidate School, he continued his military education by completing Signal Officers School and the Kennedy Special Warfare School at Fort Bragg. He was offered a position on the faculty of the Kennedy Special Warfare School but volunteered for duty in Vietnam and served an extended tour. While there he served in several positions including the operations officer for the 8th Psychological Operations Battalion.

Mr. Collins grew up in southwestern Montana and went to Carroll College in Helena from 1964 to 1967. He graduated with a B.A. degree in history from the University of Montana, Missoula, in 1968. Mr. Collins also attended the George Mason University School of Law in Arlington, Va., and did graduate work in business administration at the American University in Washington, DC.

ENERGY POLICY

Chairman HATFIELD. Would you present your associates, please.

Mr. COLLINS. Thank you, Mr. Chairman. I would like to introduce Donna Fitzpatrick, Principal Deputy Assistant Secretary for Conservation and Renewable Energy, and Dr. Robert L. San Martin, Deputy Assistant Secretary for Renewable Energy.

I certainly appreciate the opportunity to appear before this committee, Mr. Chairman, for the first time and provide information on the fiscal year 1985 budget request concerning the Department's interest in renewable energy, electric energy systems, and energy storage programs. We had a great deal of input, of course, from the members of this committee and certainly the staff, and we deeply appreciate that. I believe we have a budget document that puts DOE at the negotiating table with the Senate. This will enable the Department to play a greater role in determining what research will be pursued within what we perceive to be the Government's role.

As you know, when I assumed the position of Under Secretary, Secretary Hodel instructed me to review all the conservation and renewable energy programs and obtain input from the private sector and municipal and State government officials, as well as Members of the House and the Senate. From those varied views we have proposed new initiatives and major thrusts in the President's fiscal year 1985 budget.

One of the first priorities was to establish a thorough review of ongoing proposed programs to assure adequate funding and coverage. As the Secretary announced in October, the national energy policy plan goal is to have a mixed and balanced energy system. To reach that objective, we have to pursue a number of alternatives.

Secretary Hodel has said, and I certainly concur, that within our lifetimes we may have a new energy mix in this country, but we do not know what that mix may be. Therefore, we have to proceed along many paths to see which technologies are the most promising.

Our national goal is an adequate supply of energy at reasonable costs. Adequate supply certainly requires flexibility in our energy system, and no undue reliance on a single source of supply. Reasonable costs suggest economic efficiency within that energy system. Our strategies were to minimize Federal control and provide that mixed and balanced resource system. I think the 1985 budget request contributes to that mix, Mr. Chairman, and that mix of technology will contribute to the domestic energy supply and reduce energy dependency.

TECHNOLOGY TRANSFER

We also have focused on improved dissemination of information, or technology transfer as it is generally known. This has been implemented in a variety of ways, including high-tech partnerships in the energy efficiency and energy productivity area. The Department will develop fellowship programs with the private sector, State and local governments, and our national labs so they all can play a key role in making sure that our priorities are established correctly and that the end-use applications we advance fit their needs.

We also recognize in this budget the importance of the national laboratories. Some of the equipment in the national labs has not been up to the standards that are necessary for providing the type of research support that our professionals need.

This budget also reflects a stabilization in the energy and conservation personnel area, a commitment both the Secretary and I have made to this body.

BUDGET REQUEST

The fiscal year 1985 budget request for renewable energy, electric energy systems, and energy storage programs is $226 million. This represents an increase of approximately 75 percent over the Department's fiscal year 1984 request. It is almost 90 percent of the 1984 appropriation.

In the photovoltaics area, research will focus on the development of multilayered photovoltaic cells which offer the potential to achieve very high conversion efficiencies of up to 35 percent. Additionally, the Department is proposing to upgrade the capabilities of the Device and Measurement Laboratory at the Solar Energy Research Institute, a world-leading research center which evaluates 500 to 1,000 concepts in this area every year.

Efforts in the biofuels area include a new genetics program to develop wood resources with high yields, improved resistance to pests and disease, lower nitrogen or water requirements, and improved energy characteristics such as higher Btu content or lower moisture content. Other research efforts will include development of materials that can withstand severe ocean environments.

In the energy storage and electric energy systems programs, Mr. Chairman, one of our areas of activity will be to improve materials and components of cells and batteries and to understand selected electrochemical phenomena. We will concentrate on sodium-sulfur and zinc-bromine batteries, as well as battery testing and post-test analysis of other types of batteries. The sodium-sulfur battery has five times the energy storage capability of previous batteries.

In the thermal storage area and mechanical energy storage, activities will focus on developing efficient, cost competitive processes for producing hydrogen from water and providing technology for safe and cost-effective storage.

Electric fields effects research and the electric energy systems will provide data on field exposures and determine methods for extrapolating data from laboratory animal experiments to apply to humans. Recent articles in the popular press concerned us all regarding certain forms of cancer related to magnetic field exposure which might result from the use of high voltage direct current transmission. Public concern is growing and research will be initiated to assess the validity of this concern.

The superconducting transmission cable project will examine new insulating materials for use at ambient temperatures. Efforts will also be undertaken to assess the impact of a nuclear electromagnetic pulse on the Nation's electric network.

These are just a few of the examples of what we are pursuing in new proposals and initiatives in the fiscal year 1985 budget, Mr. Chairman.

In conclusion, let me say that I think the Department is acting in good faith with Congress. We have pledged to be receptive to the interests of this committee and the Senate as a whole. This program, I think, presents a good, long-term view of where we should be going in energy research. We are confident that these proposals will increase our understanding of the potential from virtually all renewable technologies, and we are very pleased by the input we have received from this committee. Thank you very much.

Chairman HATFIELD. Thank you, Secretary Collins.

ENVIRONMENT, HEALTH, AND SAFETY PROGRAMS

STATEMENT OF JAN W. MARES, ASSISTANT SECRETARY FOR POLICY, SAFETY, AND ENVIRONMENT

Chairman HATFIELD. Mr. Mares.

Mr. MARES. Thank you, Mr. Chairman. I am pleased to be here with you today to discuss the Department's budget request for the Office of Environment, Safety, and Health. The Department's goal, as you know, is for all of its activities to be operated in a safe, healthy, and environmentally sound manner. The headquarters Office of Environment, Safety, and Health assists in this goal by establishing departmental policy, providing guidance, providing technical assistance to the line organization for implementation of that policy, and performs independent overview and assessments for the Secretary.

I think the consequence of that activity on behalf of this Office is highlighted when we look at the charts I have provided, which show in a pictorial way the outstanding record regarding safety and health this Department had in 1983 and in previous years.

[The charts referred to appear in Mr. Mares' prepared statement.]

If we just leaf through, the first chart shows the accident incident rate which is about a third of what it is in the private sector. The second chart, lost workday incidence rate, is an indication of severity of incident, and DOE has substantially less than the private sector. The third chart deals with property loss, and its significance is that the DOE contractor property loss has been substantially less than the private sector, which is the line at the top of the page; the DOE average is the dash line in the middle of the page.

The following three charts deal with radiation exposure of our people. In fact, none of the 1983 injuries or illnesses were caused by radiation exposure. There were no accidental exposures in excess of the various allowable limits.

The first chart entitled "Radiation Dose" says the total exposure of our people through operations is about the same as received by those people in the natural background.

The next chart shows how the number of our people that are receiving doses, in excess of either 1 rem or 2 rem per year, has steadily been dropping over the last 17 or 18 years. We expect that trend to continue.

The final chart shows that the selective dose equivalent received by our people, who have received more than 1 rem has been steadily decreasing over the last 17 years. This is a reflection of the activities the Department has underway to strive to keep the radiation exposure of our people as low as reasonably achievable.

BUDGET REQUEST

From a funding standpoint in fiscal year 1985, we are requesting $37 million for the environment, safety, and health program, $5 million more than was appropriated in 1984. This increase is primarily in the nuclear safety area even though, as I just indicated, I think the Department's nuclear safety record has been outstanding. This increase is considered to be necessary to assure the continued excellent safety record, and also to improve upon it.

One of the particular areas for which we seek these funds is the emergency response capabilities that would allow us to, on a remote basis, sense radiation through a narrow measurement system. That is the subject of these large charts which I brought. Today in the El Paso area, our resources are being deployed to try to find particles from a cobalt 60 medical source which was broken into and used in a foundry in Mexico. The metal products from that foundry have come into the United States. Our knowledge to date would indicate there is no public health hazard from any of those products. However, there is some indication some of the particles were radioactive and need to be found. We have some question as to whether they may have been brought across the border, carried either by the tires of vehicles or on the soles of peoples' feet. We have for the next 10 days a group of DOE employees and contract people using a radiation survey system. A helicopter flies over a precisely defined area using very sophisticated radiation measuring techniques, both to get the type of radiation and quantity of radiation. We then map that against a planner map which is matched to the course of the plane and is set by transponders sending radio signals to the plane. Then through computational techniques we can plot the maps.

The examples of the maps are shown in the chart immediately in front of you. You can see what are called isoplats which would show where there is a higher level of radiation.

With that information, people can go to the sites with hand-carried instruments that are about the size of a briefcase. The public health authorities find these individual particles, so we can then remove them and restore the surface to its natural state.

That is one of the capabilities available to the Nation, and we have offered it to the Mexican authorities to use regarding these cobalt 60 particles that may not have been collected in the Juarez area.

Another way this capability is used is as part of the Federal radiological monitoring assessment program. That is a program which was developed after TMI. In fact, we have a test underway today—the first test since TMI—at the St. Lucie nuclear powerplant wherein the Federal Government, NRC, FEMA, Department of Energy, State and local personnel, as well as Florida Power & Light Co. personnel, are testing the procedures that would be used in the event of a nuclear accident. The Department has deployed about 100 Department personnel and contractor personnel at that site, including representatives from all our operations offices. In fact, several of my staff and I are leaving this evening to go down and participate in the second day of that program. I think it is another example of the type of activity through which our Office works to assist both the Department and the country in dealing with nuclear safety matters.

I think that the Office of Environment, Safety, and Health policy of independent overview has helped the Department to continue its excellent record of safety and health protection and environmental compliance. We look forward to continuing that and enhancing that program as a result of the budget request that we have made. I would be pleased to answer any questions that you may have, Mr. Chairman.

Chairman HATFIELD. Are there any other statements to be made today?

Mr. COLLINS. No, Mr. Chairman.

PREPARED STATEMENT

Chairman HATFIELD. Mr. Mares, your full statement will be made part of the record at this point.

[The statement follows:]

STATEMENT OF JAN W. MARES

Mr. Chairman and members of the Subcommittee, I am pleased to be here today to discuss with you the Department's budget request for FY 1985 for the Office of Environment, Safety and Health. With me to assist in responding to your questions is Robert W. Davies, the Deputy Assistant Secretary for Environment, Safety and Health.

NATIONAL ENERGY POLICY PLAN AND SAFE, ENVIRONMENTALLY SOUND OPERATION OF DOE ACTIVITIES

The overall goal of our national energy policy is to foster an adequate supply of energy at reasonable costs. The two strategies to achieve this goal are (1) to promote a balanced and mixed energy resource system and (2) to minimize federal control and involvement in energy markets while maintaining public health and safety and environmental quality. The Department of Energy implements these strategies through many programs involving diverse activities from research and development like magnetic fusion to process services like uranium enrichment. In addition, the Department is responsible for the manufacturing of nuclear weapons for national defense purposes. The DOE Organization Act establishes the Departmental goal of protecting and enhancing environmental quality and assuring public health and safety. Differently stated, the Department's goal is for all of its activities to be operated in a safe, healthy and environmentally sound manner.

The Department's health and safety record has been outstanding by any standard. Its environmental record has also been good and there are no substantiated cases of impact on public health from the Department's operations, even though there have been occasional allegations to the contrary. The Department has always been a leader in environmental protection through its research activities to define and avoid adverse environmental impacts from its operations. The Department has also made continuing efforts to be in compliance with applicable environmental requirements as they have changed through the years. In fact, planning is currently underway to modify certain previously acceptable practices to meet current standards.

The Headquarters Environment, Safety, and Health (ES&H) functions are to establish departmental policy, provide guidance and technical assistance, oversee implementation of policy and guidelines, and perform an independent overview and assessment role for the Secretary. The line organizations starting with the DOE contractor, continuing through the DOE operations office and the program office, have responsibility and accountability for the safe, healthy and environmentally sound performance of their activities.

Thus the ES&H Office has overall responsibility for establishment and oversight of policy implementation by line organizations to assure safety and health of the workers and the public, and protection of the environment at DOE's operations.

GOAL OF OFFICE OF ENVIRONMENT SAFETY AND HEALTH

The goal of the Office of Environment, Safety and Health is to assure safe and environmentally sound operation of DOE activities. This is done by providing the Secretary and the Department a competent, adequate, independent oversight capability at headquarters which (i) as appropriate reviews, assesses, appraises and in some cases approves, Departmental (including contractor) activities; (ii) develops appropriate policies, standards and guidance for DOE; (iii) identifies and supports research to assist DOE to operate in a safe and environmentally sound manner; and (iv) provides related technical (including quality assurance) assistance to Departmental activities to assist them in operating in this manner. These functions are performed while recognizing the unalterable responsibility of the line organizations for safe and environmentally sound operation of the activities under their supervision.

The recent realignment of functional responsibilities within the Department placed the Office of Environment, Safety and Health under the Assistant Secretary for Policy, Safety, and Environment. This change eliminated the previous split in management focus whereby the Assistant Secretary was responsible for both safety and environmental oversight as well as for several major outlay programs which required substantial management attention. The change will result in increased management attention to the Department's environmental programs and its nuclear and operational safety functions. This in turn is expected to bring about an increased emphasis Department-wide on the safe, and environmentally sound operation of DOE activities.

The Environment, Safety and Health Office provides to the Secretary and other senior managers of the DOE an independent overview assessment of, and technical assistance to the Department's management of its facilities to assure safe and healthful workplace conditions, the safety and health of the public, protection of the environment, and compliance with applicable ES&H-related statutory and regulatory requirements. The office also assures that energy issues compatible with national energy goals are considered in the development of proposed environmental requirements.

Achieving the Department's environmental, safety and health protection and quality assurance objectives hinges on a solid partnership between the Environment, Safety, and Health Office and the Department's line programs. The ES&H Office furnishes the line programs with applicable ES&H requirements through general policy orders, monitors their efforts in complying with these requirements, and assists with technical advice in resolving implementation problems. This allows the line organizations, which have the principal responsibility for safe and environmentally sound operations, to proceed with greater assurance that they will not incur interruptions from accidents or litigation stemming from non-compliance with ES&H-related laws or practices.

OUTSTANDING SAFETY AND HEALTH RECORD

The Department's safety and health record in 1983 was outstanding. The Department has the safety and health responsibility for 157,000 Federal and contractor employees who operate facilities with a property replacement value of about $65 billion. The Department's fatality, injury, and illness rates for FY 1983 were not only well below the rates of the private sector, (i.e., only 1/5th of the private sector's fatality rates and better than 1/3rd of the private sector's recorded illnesses and injuries rates), but also below the Department's own averages of its annual rates for the period 1978 through 1982. None of the FY 1983 injuries or illnesses were caused by radiation exposure, and there were no accidental exposures in excess of the various allowable annual limits. The total reported property loss for the Department in FY 1983 was approximately $3.1 million. The loss rate was approximately half a cent for every hundred dollars of property valuation which is a significant improvement over the latest 5-year annual average for DOE of .89 cent per hundred dollar valuation.

The accidents per million miles and dollar loss per 1,000 vehicle miles rates were less than one-half the comparable rates for all nation-wide travel, as reported by the National Safety Council. The Department also owns or contracts for 48 aircraft, none of which were involved in an accident. In addition, there were no marine or railroad losses reported during FY 1983.

Of the 85,000 employees routinely monitored for radiation exposure, only 43% received a measurable dose in 1982, the latest calendar year for which complete information is available. Of these, only 1.6% received a dose greater than 1 rem and no employee received a dose in excess of the allowable 5 rem limit.

The safety and health record indicates that the Department's performance in all areas continues to be far better than comparable rates for the private sector.

PRINCIPAL STATUTORY AUTHORITY

The statutory authority governing the ES&H Program includes the DOE Organization Act which establishes a Departmental goal of protecting and enhancing environmental quality and assuring public health and safety; the Atomic Energy Act which exempts DOE and its contractors from certain licensing requirements (The DOE requires that the Department's operations be conducted in accordance with comparable health and safety practices.); and the National Environmental Policy Act. This Act requires consideration of environmental factors in agency decisionmaking, including as appropriate, the preparation of environmental assessments and environmental impact statements.

PROGRAM ORGANIZATION

The Program's functions are carried out by five major components: Nuclear Safety, Quality Assurance and Standards, Operational Safety, Environmental Compliance, and Environmental Analysis. Their activities include the development of policies and standards; oversight to monitor program and field office performance in complying with DOE policies and standards, technical and policy guidance assistance to foster compliance; the review of National Environmental Policy Act documents; and the analysis of energy/environmental issues.

FUNDING

In FY 1985 we are requesting $37.1 million for the Environment, Safety and Health Program which is $5.0 million more than appropriated in FY 1984 as noted in the following table, and discussed in the following sections. The increase is primarily in the nuclear safety area even though the Department's nuclear safety record has been outstanding. The planned increase is considered necessary by the Department to assure the continued safety of operations and to improve on the Department's excellent safety record. It is primarily in health physics for improving and standardizing plant measurement and operating procedures, in emergency response by enhancing the remote sensing capabilities of the Aerial Measurement System, and in criticality safety by upgrading the safety assessments and the safety training for affected contractor and DOE employees. The remaining activities will continue at essentially the same level of effort as in 1984.

Funding Summary

(Budget Authority in Millions)

Environment Safety and Health	FY 1984 Appropriation	FY 1985 Request
Operating Expense:		
Nuclear Safety	$ 11.5	$ 16.2
Quality Assurance and Standards	0.9	1.0
Operational Safety	8.8	9.2
Environmental Compliance	1.5	1.7
Environmental Analysis	2.4	2.6
Program Direction	5.4	4.9
Subtotal	30.5	35.6
Capital Equipment	1.6	1.5
Total ES&H	$ 32.1	$ 37.1
Staffing - Full-time equivalent	95a/	95a/

a/ Excludes 2 FTE's budgeted under the Nuclear Waste Act Fund.

FY 1984 PROGRAM PLANS

The FY 1984 plans include:

- Conducting comprehensive environmental protection, safety, and health protection appraisals of three field organizations and of two Headquarters program offices. A comprehensive appraisal is comprised of in-depth appraisals of up to 10 functional ES&H areas performed in conjunction with, and as input to, a management appraisal of the organization being appraised.

  This comprehensive appraisal effort has resulted and is expected to continue to result in numerous ES&H improvements such as: enhancing the quality of field office reviews of nuclear facilities and upgrading overall contractor surveillance, through design reviews, construction monitoring, etc.

- Providing training to DOE and DOE contractor personnel in the areas of Human Factors, Nuclear Criticality Safety, Quality Assurance Awareness, and Prevention of Significant Nuclear Events.

- Expanding the criticality safety activities including the upgrading of the statistical measurements technical manual, used throughout DOE operational functions to insure control of fissionable material liquids, to include the latest up-to-date data.

- Testing the Federal Radiological Monitoring and Assessment Plan in an interagency field and headquarters level exercise with NRC, FEMA, state and local authorities and The Florida Power and Light Company personnel at the St. Lucie Nuclear Power Plant on March 6-8, 1984.

- Continuing field testing of prototype improved neutron measurement devices for workplace application.

- Conducting quality assurance surveys of Bonneville and Western Area Power Administrations to determine the status of policy implementation, thereby completing the initial base-line surveys at all major DOE sites, and performing in-depth quality assurance appraisals of four selected major projects (namely the Fuel Materials Examination Facility at Richland, the Assembly Facility at PANTEX, the Uranium Enrichment program at Oak Ridge, and the Crystaline Rock radioactive waste project under Chicago Operations Office) to determine adequacy of their quality assurance programs and activities to meet their needs and objectives.

- Issuing guidance to Headquarters, field, and contractor organizations for the conduct of environmental protection appraisals and audits incorporating industry practices.

- Implementing revised environmental assurance procedures for the DOE Remedial Action Program.

- Conducting fire protection surveys of five DOE sites (namely Brookhaven Laboratory, Bendix Plant at Kansas City, Mound Laboratory, Sandia in Albuquerque, and Argonne-West in Idaho) and issue initial guidelines for optimum fire management systems for fire environments specific to DOE.

- Completing action on about 600 requests from DOE programs for NEPA-related support, including: about 200 analyses to determine/confirm the level of NEPA documentation required for DOE actions, i.e., Environmental Impact Statement (EIS), Environmental Assessment (EA), or neither; and about 120 independent reviews of EIS's and EA's.

  Major EIS' include those for: the restart of L-Reactor; the Process Facility Modification at Hanford; the Special Isotope Separation Project; the Fuel Processing Restoration Project at Idaho; Bonneville Power Administration's Expanded Regionwide Weatherization Program; the Niagara Falls Storage Site Remedial Action Project; the Salt Lake City Remedial Action Project; and the Manitoba, Dakota, Nebraska (Mandan) 500 KV transmission line from Manitoba thru the Dakotas to Nebraska.

- Continuing to participate in Departmental assessments concerning acid rain and other transboundary air pollutants. Much of this work will be in interagency or international forums.

FY 1985 OBJECTIVES

In FY 1985 the Program plans to expand the overview and assessment efforts of Departmental activities to assure that environment, safety and health policies are effectively implemented. The principal objectives in FY 1985 include:

- Developing better training guidance for reactor and nuclear facility operators to improve operational safety at DOE nuclear facilities.

- Maintaining and improving the radiological emergency response capability for DOE facilities.

- Developing improved methods for measuring and assessing the amounts of inhaled or ingested radioactive materials to assure compliance with radiation exposure limits recommended by national and international authorities.
- Developing and implementing improved methodologies, particularly in the area of criticality safety, for assessing the safety of nuclear operations.
- Issuing revised environmental protection, safety and health protection guidance and conducting appraisals of ES&H performance at three Operations Offices.
- Issuing improved quality assurance and unusual occurrence reporting guidance based on the analysis of the initial baseline survey completed in FY 1984; and appraising implementation of the guidance at six field or program offices.
- Assisting DOE organizational units in preparing sound NEPA documents and performing reviews of all such required documents to facilitate Departmental programs.
- Analyzing proposed regulations and statutes, such as modifications to the Clean Air and Clean Water Acts, to ascertain the potential impact on DOE program or interests.

SUMMARY

The ES&H policies and independent overview have helped the Department to continue its excellent record of safety, health protection, and environmental compliance at the Departmental operational facilities.

The Environment, Safety and Health Program to date has assured that national energy policies and departmental plans, programs and operations have effectively addressed and expeditiously resolved environmental and safety problems. The proposed FY 1985 budget request provides the resources necessary to continue a strong independent Environment, Safety and Health overview of Departmental operations and activities.

I am prepared to answer your questions or comments on this program.

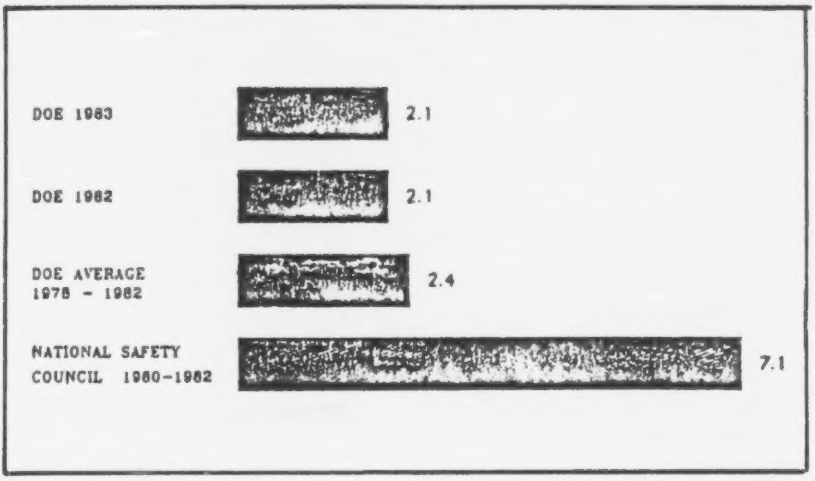


Figure 2. Recordable Injury/Illness Incidence Rate (Cases Per 200,000 Workhours)

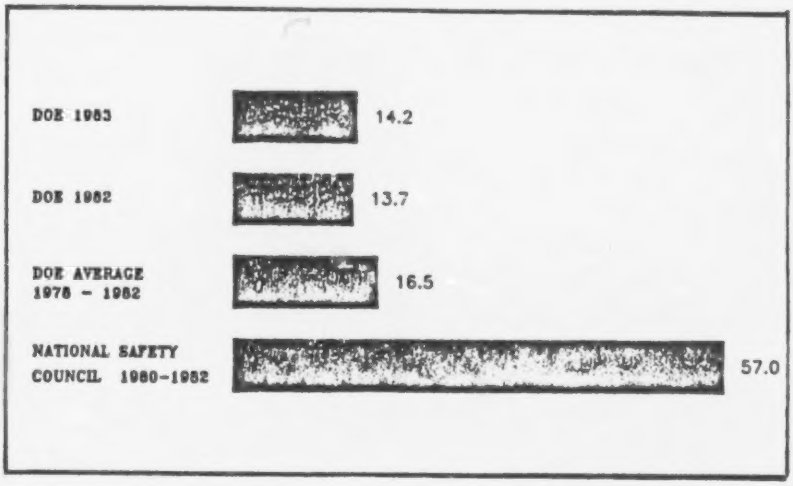
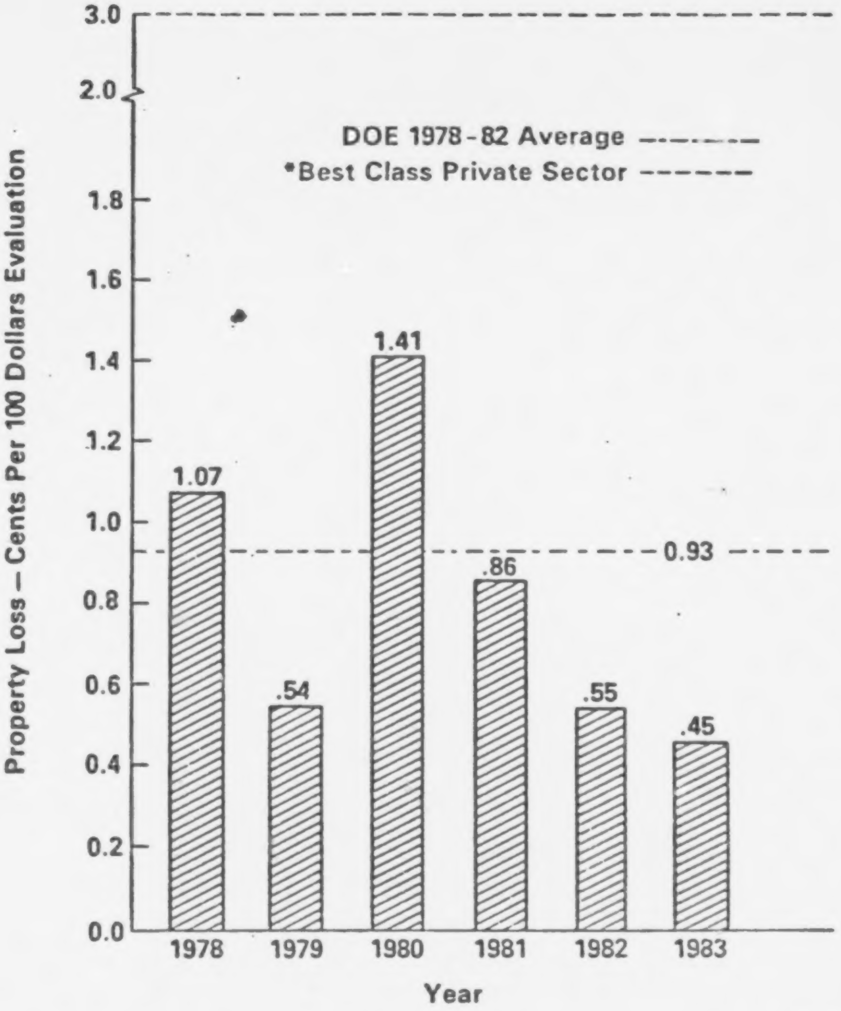


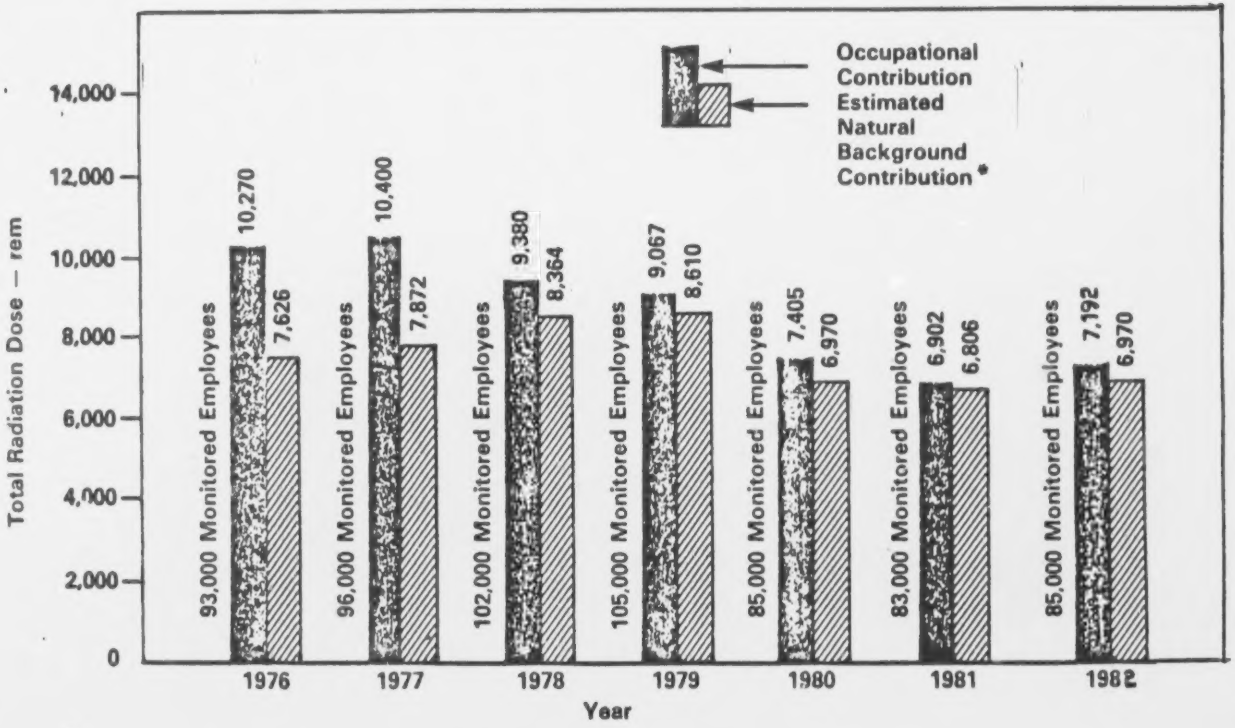
Figure 3. Lost Workday Incidence Rate (Days Per 200,000 Workhours)



*From discussions with engineering personnel from the fire insurance groups.

Figure 3. DOE and Contractor Total Property Loss Rates

RADIATION DOSE



* This assumes an average exposure level

Figure 11. Comparison of Total Radiation Dose Received by DOE Monitored Employees and Dose Received from Natural Causes

EMPLOYEE EXPOSURE DOSES
GREATER THAN 2.0 REM

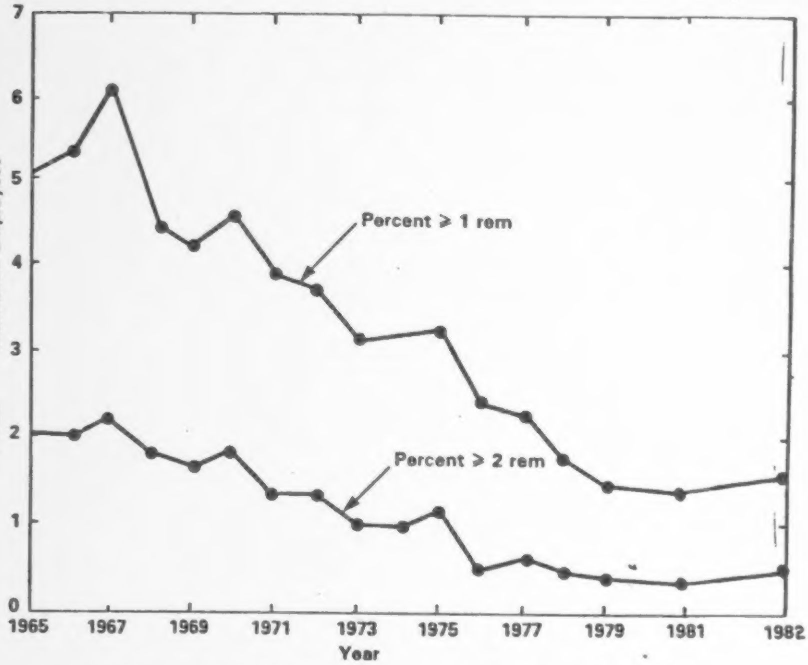


Figure 10. Percentage of Employees Receiving External Doses Greater than 1 Rem and Greater than 2 Rem (5 Rem per Year DOE Standard)

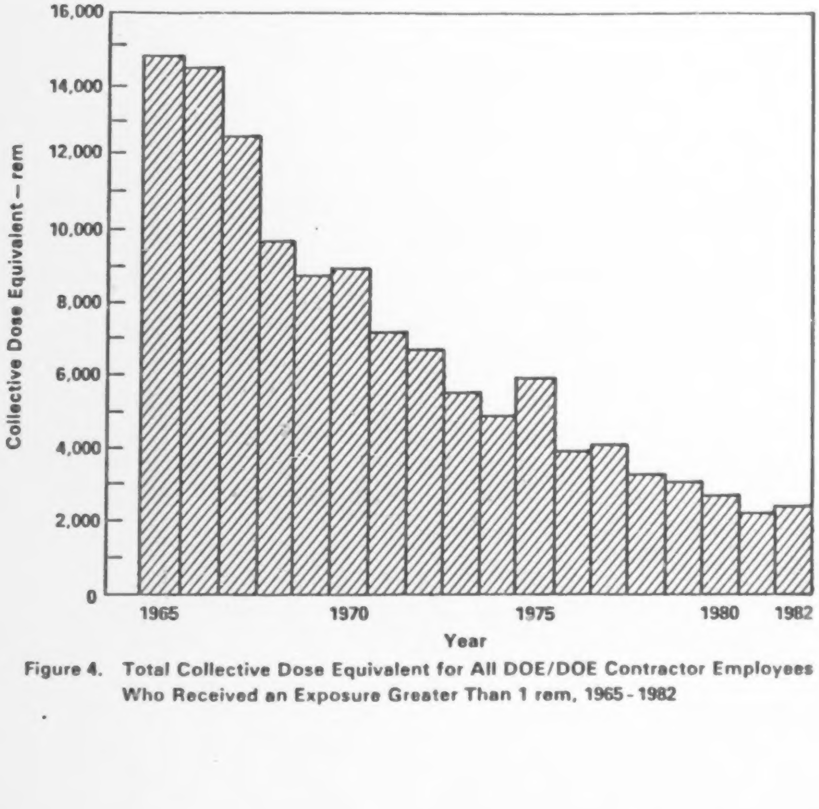


Figure 4. Total Collective Dose Equivalent for All DOE/DOE Contractor Employees Who Received an Exposure Greater Than 1 rem, 1965 - 1982

EMPLOYEE RADIATION EXPOSURE

Chairman HATFIELD. Let me take this in reverse order, Mr. Collins, if I could, and pick up on a couple points Mr. Mares has raised. Looking at your chart relating to employee exposure doses of radiation, I believe that correlates to page 6 of your testimony, as I read this chart, it appears to me—first of all, let me ask you, why is there this time lag on data that we don't have any data now for 2 years? I believe you say the last available data was in 1982.

Mr. MARES. I think that is the last day we have complete, full-year data. We do keep data on a more current basis than that, and I would be pleased to provide you the last full part of 1983 that we have.

[The information follows:]

RADIATION EXPOSURE DATA

The most recent set of complete data on DOE and DOE contractor employee radiation exposures available is for 1982. A copy of the report presenting that data will be provided to the subcommittee.

Our contractors are required to submit the site data for 1983 by March 31, 1984. The 1983 report will be published several months after that date following compilation, validation, and interpretation of the submitted data.

Chairman HATFIELD. It appears from this chart, if I am looking at it correctly, that the exposure dose has been on a slight increase since 1981 after having been on a fairly even line of decrease from 1965. Could you comment?

Mr. MARES. Are you looking at the chart which is headed, "Employee Exposure Doses Greater than 2 Rem"?

Chairman HATFIELD. Right; those lines show me a slight increase from 1981 to 1982, and you haven't had any new data since 1982. Why the increase after a period from 1965 where there has been a general dimunition?

Mr. MARES. Mr. Chairman, let's look first of all at the percent of the total monitored employees that are receiving in excess of that level. It does, in fact, show a slight percentage increase. I believe that there is some slight increase in the monitored employees, but the more precise location-by-location reason for that change is not in my hands at this moment. I would prefer to answer it for the record.

Chairman HATFIELD. Could you supply that for the record?

Mr. MARES. My understanding, from reviewing with the operations offices, is that the general trend to reduce the amount of exposure to our people continues and although that chart acknowledges a percent increase, that does not indicate in our view either a lack of attention to this or that we are not being successful in our general efforts. I would prefer to look into it further and respond.

[The information follows:]

DOE EMPLOYEE RADIATION EXPOSURE

The slight increase in 1982 in total radiation dose received by DOE-monitored employees is due to changes and increases in operations in the defense-related activities involving radioactive materials. This same explanation reflects the reason for the slight increase in the percentage of DOE employees receiving radiation exposures greater than 1 and 2 rem.

Chairman HATFIELD. The line not only interests me, but your last sentence in that particular paragraph, you make a comparative analysis thereby saying the 1.6 represents—and that is the 1982 figure—the 1.6, I assume, represents a better than 50-percent improvement compared to DOE's latest 5-year annual average. Well, you take that 5-year annual average and that goes back to 1973, and if you look at that 1973 figure, it was down and then it went up slightly in 1973 with a sharp decline around 1976, sliding through 1977, then a continued downturn from 1977, 1978, 1979, 1980, 1981. Then it appears that around January 1981, it starts on an increase, about January 20, and I wish you would supply for the record, and also tell me whether or not that was a time when we had a decrease in the budget for this program. I don't want to be too blunt about this.

Mr. MARES. I don't think there is a correlation between the amount of funding for this program, and the safety record of the Department, because this program is only a very small part of the total amount of funds or personnel that are spent on safety matters within the Department.

Each of the program areas spends money on personnel, as well as facilities, to ensure that they are being operated in a safe and healthy fashion. Our Office's function is to provide technical assistance to those offices so that they have the benefit of the latest technology and techniques. We interchange information around our full system as well as to provide an oversight on the procedures and processes that are being used by the various offices so that we can assure the Secretary that we are, in fact, operating our facilities in a safe and healthy fashion.

As I say, the amount of exposure that our people are getting compared to the civilian reactors shows they are substantially better off than what the workforce receives in the civilian reactor. I think it is a record that the Department can be quite proud of in spite of the fact this particular chart would show the percent either greater than 1 or 2 rem, both of which numbers are less than the workplace standard, which is an international standard that we adopted. None of our people received as high as that 5 rems.

Chairman HATFIELD. Well, the bottom line is I am sure it does interest you for the first time in a 5-year span, it appears in January 1982, it starts an increase. I would think it interests you as well as it interests me, and I would like to have perhaps a more detailed analysis for the record.

Mr. MARES. Your interest, for sure, is my interest, Mr. Chairman.

[The information follows:]

TYPOGRAPHICAL ERROR IN PREPARED STATEMENT

I would like to correct for the record that the DOE employee radiation exposures above 1 rem do not decrease 50 percent in the 5-year period, but rather 5 percent. This was an error. However, radiation exposures, in fact, have decreased several fold during the last 15 years and, with minor exception, the decline was steady.

NUCLEAR SAFETY REQUEST

Chairman HATFIELD. Another thing I wanted to followup on is, I note that you have a $5 million increase in your fiscal year 1985 request over 1984 for nuclear safety and maybe there is a correlation here, I don't know. I would like to know basically, though, what the breakdown of that $5 million increase is over the 1984 level. You can supply that for the record, if you will.

Under your general budget request for nuclear safety, as I say, it shows an increase over the current year.

Mr. MARES. In broad terms, part of the increase is to assist us to extend our capabilities in the radiation survey and atmospheric monitoring capability and another portion deals with instrumentation so that you can detect varying types of radiation at lower levels. It is funding for technical assistance or advances in its broadest sense, that would be available to the Department's vast range of facilities to assist us in continuing a very outstanding record. I will be happy to be more precise.

[The information follows:]

NUCLEAR SAFETY BUDGET

[In thousands of dollars]

Category	Fiscal year 1984 appropriation	Fiscal year 1985 request
Reactor safety	$875	$1,000
Process facility safety	478	530
Criticality safety	590	1,530
Nuclear safety technology	552	900
Training	835	1,340
Health physics	1,980	3,200
Emergency preparedness	6,190	7,700
Total	11,500	16,200

SOLAR ENERGY BUDGET TREND

Chairman HATFIELD. Secretary Collins, let's take a look at the trend line in the solar request. I note for the first time in 3 years—well, after 3 years, I should say—after 3 years of a decline in budget requests for solar and renewable activities that there is a leveling off of that decline from 1984 to 1985. 1985 is not quite the level of 1984, but it certainly does show a change of that trend line, leveling off from a rather sharp decline.

First of all, would you like to comment on that particular observation?

Mr. COLLINS. Mr. Chairman, I think this is consistent with Secretary Hodel's feelings, and what I have promised the members of this committee during the confirmation process. I heard that the members of this committee wished to see a budget proposal more in line with your views so that we play a more viable role in determining the research priorities of the Energy Department. I would like to say not only is that trend line correct, certainly relative to appropriations, but also it is about 75 percent greater than our 1984 request. We are very pleased with that.

Chairman HATFIELD. I commend you and the Secretary for this responsiveness to this committee's often-stated belief that we should be doing more in this area to reduce that dependency we have on fossil fuel generally, and particularly that which is imported from the Middle East.

Would you make any estimate as to what this may offer for the future in terms of the next 3 years, in the next 2 years?

Mr. COLLINS. I believe that the President and the administration are hopeful that a well-supported program will result from our closer working relationship with the Congress. If that works out well, and I hope that it will, we should have a very strong research program from which the private sector can pursue further development.

Chairman HATFIELD. So that means that it will continue this trend line, this trend line will continue upward.

Mr. COLLINS. This is an infant industry. It certainly is a varying field because we make breakthroughs we don't expect, while progress lags in some areas. And in such an infant industry, I think we may have new concepts that may be worthy of support in the budget.

I think it is a very fluid situation, but I feel very confident that we have addressed most of the research opportunities which currently have been identified in the renewables field. I hope we can continue along that path.

RENEWABLE ENERGY FUTURE PROSPECTS

Chairman HATFIELD. You will know better after November, too, how much we continue on what path.

Secretary Collins, you are familiar, I am sure, with PG&E. I think it is the largest utility in the country today. They recently announced that through planning of about 2,300 megawatts, I believe from 300 cogeneration renewable energy projects that they expect to utilize that source to provide their projected needs, at least in the foreseeable future.

California has attractive incentives for such renewables, as you well know. Do you think that these statistics are encouraging and would there be any opportunity to, as you see it, for this to be applied on a broader base than just California, say, in the next 5 to 10 years? How do you assess the possibility of solar renewables providing a major source of the increased need nationally as well as in California?

Mr. COLLINS. Mr. Chairman, I believe that the use of renewable energy will be growing. It will be increasing and for a variety of reasons. The American public has a great affinity for these types of energy sources for these resource technologies because of environmental, safety, and health, as well as energy-related reasons. I think it is the wave of the future that is now underway in California.

When the Secretary and I went to the Renewable Energy Technologies Symposium and International Exposition which was conducted there last year, we visited many projects, and talked with people who are taking a leading role in transferring this technology within industry.

I believe it is important to point out to utility executives and others from around the country that some of our largest utility companies are vigorously pursuing renewables because it is good business, and not too bad for public relations as well.

ENERGY TAX CREDITS

Chairman HATFIELD. Following up on that issue, I know the administration has frequently stated in the past they felt that the energy tax credit approach would assist the development of solar renewable sources, and as that grows and the Federal Government is participating in the role it would tend to diminish, reduce the—particularly in R&D.

What is your view of the need to continue or to extend the energy tax credits? As you know, 1985 is a due date here, and we are going to have to make some determination as to what we do after that. What is your thought at this time?

Mr. COLLINS. Mr. Chairman, from an energy standpoint, the Department feels that tax credits play an extremely vital role in helping this infant industry get on its feet. We have a variety of success stories, like ethanol and other types of renewable energy.

I think, however, each industry should be approached a little differently in terms of tax credits, as well as to some degree with regard to research as our Energy Research Advisory Board has indicated. We are trying to provide a level playing field, and I know it is difficult to deal with from a legislative sense.

The Secretary and I have been speaking within the administration about the needs of the infant renewable energy industry. We are now at a point waiting for a vehicle to come together in Congress, so we will be directing our attention toward something specific as opposed to a general concept.

Chairman HATFIELD. Do I understand then that you would support extension of the tax credits beyond the 1985 date, the basic fabulous record they have created up to this time?

Mr. COLLINS. I think from an energy standpoint, it is extremely important. I recognize that there are other pressures within the administration. Our view is to approach each legislative proposal individually.

Chairman HATFIELD. In other words, I don't have to lobby Secretary Hodel; I just have to lobby Secretary Regan? That is an unfair question. You may ignore that question.

Mr. COLLINS. You are right about the first part of that, Mr. Chairman.

Chairman HATFIELD. We will see you afterward to get the second-part answer. [Laughter.]

REGIONAL BIOMASS PROGRAM

The Congress, as you know, provided $4 million in fiscal year 1984 for the regional biomass program. Your request is for $3.1 million. If you have it with you—if not, would you supply for the record, why we have a reduction and how is that reduction going to be allocated out across the program or the regions.

Mr. COLLINS. I will be glad to, Mr. Chairman.

Chairman HATFIELD. Particularly as it would affect my region.

Mr. COLLINS. I will give that special emphasis, Mr. Chairman.

[The information follows:]

REGIONAL BIOMASS PROGRAM

The DOE request for the regional biomass program is approximately 20 percent lower than the amounts appropriated in fiscal year 1984. The Department believes that the previous funding of program startup costs, reduced requirements for Tennessee Valley Authority and Bonneville Power Administration technical support to program participants for organizational purposes, and the timing of fiscal year 1984 awards, justifies the fiscal year 1985 funding request without impacting programmatic activities. DOE believes that an increased cost sharing by participants can be expected as this program matures.

MOD-5 MULTIMEGAWATT WIND TURBINE

Chairman HATFIELD. Could you give me the current status of the MOD-5 project?

Mr. COLLINS. Mr. Chairman, regarding MOD-5B, we are expecting a proposal from Boeing in the immediate future. The Department is waiting to see if they will meet the congressional interest and cost sharing requirements——

Chairman HATFIELD. Why did General Electric withdraw from this?

Mr. COLLINS. They cited about three or four reasons, Mr. Chairman; primarily the stability of oil prices, lower anticipated load growth, tax credit uncertainty, and perceived decline in customer interest.

ADDITIONAL PREPARED QUESTIONS FOR THE RECORD

Chairman HATFIELD. Mr. Collins, we have some other questions that have been prepared by staff that I would like to submit to you and to you, Mr. Mares, for your response. I would hope you could give those your prompt attention, because we would like to get this record completed and moved to markup and conclude this appropriation matter as quickly as possible.

I believe Senator DeConcini has also submitted some questions for your response. Those questions will also be made part of the record.

As you know, we are sort of in a bobtail session, and I want to avoid all the appropriation activities that I can that befall us in a lame duck session, if we have to go to that. I am hoping I can get this particular appropriation measure on track very quickly. So if you can do that, we would appreciate it.

Give my warmest regards to the Secretary, and I am very delighted—I certainly want to give Ms. Fitzpatrick and Dr. San Martin any opportunity to make any comments; maybe you would like to ask me some questions.

Ms. FITZPATRICK. Thank you, Mr. Chairman, I will pass. [Laughter.]

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Renewable Energy Forecasts

Question: In you view, what will be the overall contribution of solar and renewable to domestic energy production in the next 5 years? 10 years?

Answer: Recent experience has pointedly illustrated the difficulty of making energy projections of lasting credibility. This concern is particularly relevant to the area of renewable energy which encompasses both technologies that require additional research and development before achieving marketplace viability and technologies which have undergone some degree of initial industrial commercial deployment.

Employing relatively conservative assumptions, the Department estimates that renewable energy will increase its contribution to the domestic energy supply system to approximately 6.8 quads by 1988 and up to 8.2 quads by 1992. Estimates performed for the NEPP-IV further conclude that renewable energy technologies may represent as much as 10.0 - 13.5 quads of primary energy supply by shortly after the turn of the century.

Solar Technology Transfer

Question: Discuss in more detail the proposal for increased emphasis on technology transfer activities.

Answer: We view technology transfer as a reciprocal process that serves as a vital link between the public and private sectors through which industrial priorities are considered early in the Federal planning process and the results of Department of Energy research and development program are communicated to the appropriate users. During the past year we have reevaluated our technology transfer activities from this viewpoint and in light of the progress made in the solar energy programs. It was concluded that significantly increased amounts of technology information and experience resulting from both departmental and private sector programs had been developed and should be made available to potential users in a form suited to their needs.

The FY 1985 program will continue to support the solar technical information activities of the Solar Energy Research Institute, operation of the Conservation and Renewable Energy Inquiry and Referral Service (CAREIRS), costs of technical document reproduction by the DOE Technical Information Center, and expenses associated with Congressionally mandated reports preparation. In addition, new activities are planned to strengthen and improve the technology transfer program. These include a technology transfer assessment activity and a focused series of seminars and workshops.

Regional Biomass Funding and Status

Question: Congress provided $4 million for the Regional Biomass Program. Your request includes $3.1 million. What is the reason for the reduction? Please provide a specific breakdown of how the reduction will be allocated.

Answer: The DOE request for the Regional Biomass Program is approximately 20% lower than the amount appropriated in FY 1984. DOE believes that the previous funding of costs for program startup, reduced requirements for technical support to program participants for organizational purposes, and the later than anticipated issuance of FY 1984 awards results in a reduced need for FY 1985 funding without impacting programmatic activities. Additionally, DOE believes that an increased cost-sharing by participants can be expected as this program matures.

Municipal Solid Waste Activities

Question: How much is requested in FY 85, as compared to FY 84, for municipal waste activities? Provide an explanation of the proposed activities.

Answer: A total of $2.3 million was allocated for Energy from Municipal Waste research between the Interior and Energy and Water Development appropriations.

The FY 1984 appropriations are committed to developing knowledge of the fundamentals of converting municipal solid waste to liquid or gaseous fuels either by thermochemical (heating) of biochemical means. In the thermal area, specific knowledge is being gained on product formation and on the effect of various conversion parameters such as temperature, pressure, time and etc. In the biochemical area, knowledge of biophysics of organisms that convert municipal solid waste (MSW) and sewage sludge organics to methane is being gained. In additional, research to convert MSW to diesel fuel through a combination of biological and physical processes is being pursued. A test bed (RefCOM) is being operated to refine the feedstock preparation parameters and to obtain long-term operational parameters. In conjunction with the landfill gas industry, an understanding of the migration of gases through a landfill surface is being obtained. Additional research explores feedstock preparation systems and environmental concerns.

The FY 1985 Biofuels request includes approximately $3 million relating MSW technology, which will be used to continue the research efforts from FY 1984 to develop the technology data base to produce liquid and gaseous fuels. The supporting research will expand to include work on the materials of conversion equipment to reduce corrosion erosion.

Alcohol Fuels Activities

Question: For the record, provide a detailed explanation and the funding levels for alcohol fuels activities.

Answer: The Department is proposing approximately $8.2 million within the Biofuels Program to continue alcohol fuel conversion technology research and development.

Research relating to ethanol conversion technology, $5.5 million in FY 1985, will focus on the development of acid and enzymatic hydrolysis systems to convert lignocellulosic feedstocks such as trees, farm residues and etc. to alcohol. This includes genetic research on yeasts and bacteria, and improvements on fermentation and product separation.

Research relating to methanol conversion technology, $2.7 million in FY 1985, will focus on investigation on optimum operation of an oxygen downdraft gasifier to produce syngas from lignocellulosic materials and development of the subsequent cataysis step to methanol.

DOE notes that it is proposing an additional $10.4 million for improvement of organic feedstocks which, while not a historical portion of Alcohol Fuels R&D, has a great bearing on eventual viability of alcohol fuels technology.

Within feedstock R&D, emphasis will be placed upon herbaceous energy crops, short rotation intensive culture and aquatic cropos in FY 1985.

Municipal Solid Waste Activities

Question: Discus the importance of the RedCOM facility and its funding profile in FY 84 and FY 95.

Answer: The Refuse Conversion to Methane (RefCOM) project is located on a private landfill site in Pompano Beach, Florida. It is a 100 ton/day test bed facility designed to anaerobically digest municipal solid waste to produce methane gas, It is the only facility of its scale available in the world in which experiments on the anaerobic digestion of municipal solid waste and sewage can be undertaken. RefCOM is developing the facility design data and operational parameters necessary for industry to demonstrate the technology on a full scale. A significant accomplishment this past year has been a 90% reduction in energy input to operate the system. A cost-sharing arrangement has been signed between the Gas Research Institute, Waste Management Inc., and the Department to optimize operating conditions, maximize product yields and evaluate laboratory results.

The technology is particularly attractive for medium size communities, population of about 250,000, since it combines two major city problems, solid waste disposal and wastewater treatment, at one location. The resulting system will produce methane for use as synthetic natural gas or vehicle fuel. The effluents from the system can provide sufficient energy to operate both the facility and an adacent wastewater treatment plant.

The Department's funding for RefCOM is $500,000 for FY 1984. The planned commitment of funds in FY 1985 is $500,000. Industry has provided $700,000 cost-sharing in FY 1984. Cost-sharing for FY 1985 will be negotiated.

Genetic Research for Biomass Feedstocks

Question: Explain the need to proceed with the new genetics program mentioned in your statement. What funding level is requested in FY 85?

Answer: The Department request includes $1.5 million for genetics research to improve selected species of high energy potential. Previous efforts to develop biomass feedstocks focused on the identification of superior inheritable characteristics within species. Planned efforts will examine the potential to develop energy crops which combine desirable genetic characteristics for high energy content and productivity, and ability to survive harsh conditions and disease. The Department considers this an opportunity to achieve significant breakthroughs and a prudent complement which builds upon the more measured progress expected through less advanced techniques.

Photovoltaic Industry

Question: Discuss briefly the progress and accomplishments of the PV industry over the last five years.

Answer: The most impressive gains have been in production volume which increased about ten times, from 2 Megawatts in 1979 to 20 Megawatts in 1984. Prices have declined by more than 50 percent. The quality of product, mainly measured in durability, has increased so that projected lifetimes of modules have risen from less than 5 years to well over 15 years.

Photovoltaic Materials Research

Question: Explain the proposed increase in materials research.

Answer: The increase for materials research for photovoltaics from $26,000,000 in FY 1983 and in FY 1984 to $31,000,000 in FY 1985 is due to the momentum and opportunities generated recently in several areas of both single-junction thin films devices and advanced multiple-junction devices. In the single-junction thin film activity, the amorphous silicon initiative has resulted in three cost-sharing industrial contracts which will continue through FY 1985 into FY 1986. The copper-indium-diselenide and the cadmium telluride activities are moving rapidly toward a solution of key problem areas for which the researchers have already developed improved understanding and are now ready to apply significantly more focused research efforts. Similar improved understanding has been developed for the very high efficiency multiple-junction devices.

The major issues to be addressed through FY 1985 funding include depositing higher-quality amorphous silicon more rapidly while maintaining desirable uniform properties, eliminating instabilities associated with contacts, developing interface connections for multiple-junction devices, and developing amorphous silicon alloys and polycrystalline thin film materials with appropriate bandgap properties for multi-junction devices.

Some of the additional funds will be used to improve the measurement facilities and capabilities for characterizing the physical and chemical properties of these newer materials and to initiate a university basic research activity aimed at bringing in new ideas for advancing photovoltaic conversion technology through coordinated basic research and education.

Innovative Concepts-University Research

Question: How much is requested for innovative concepts-university research?

Answer: The innovative concepts request is for $2,500,000 which will support a variety of advanced research activities. The program has been supporting a "new ideas" solicitation on an annual basis which has led to support of initial studies on new materials, coatings. structures, models, and processes with potential usefulness for photovoltaic technology. The FY 1985 funding will be partially used to support the most promising of the ongoing "new ideas " and allow for another solicitation.

The funds will also be used to continue supporting the DOE-wide Small Business Innovative Research project and for a university basic research activity to advance photovoltaic conversion technology through coordinated basic research and education.

Photovoltaic Systems Research

Question: What is the rationale for the reduction in systems research?

Answer: Industry is now a strong performer in this area, at times leading the Federal program. Many critical objectives have been achieved. It is felt that concentration on attaining major potential increases in performance and efficiency and less costly and more durable photovoltaic modules is the more appropriate use of Federal resources.

Single Junction Thin-Film Cells

Question: What is the rationale for the emphasis on single-junction thin film cell R&D?

Answer: The emphasis on single-junction thin film cell R&D is based on the fact that the highest probability of meeting the long-range goal for photovoltaics, producing electricity competitively with other electricity generating options, lies with these thin film cells. A second reason for emphasising this activity is that its results will provide a valuable technology base for future developments in multiple-junction high efficiency devices. This element also includes development of new measurement techniques, instrumentation and analysis, and insolation research, all of which assist the entire PV program as well as other solar activities.

Sacramento Municipal Utility District

Question: What is the status of the SMUD project? Why is there no request for funding in FY 85?

Answer: The first megawatt is under construction and will be operational in June 1984. The second megawatt will be operational approximately one year later. A concept reevaluation study is underway to determine the optimal design for SMUD's subsequent increments. Thus far, SMUD has successfully resolved several systems level questions including cost-effective grounding, factory mounting and prewiring of modules into large panels, and the optimization of very light yet strong mounting structures.

No funds are being requested in FY 1985 because there are very limited research and development objectives that would be met by adding costly capacity, compared to the far greater impact that would be achieved by directing resources to advanced photovoltaic technology. Additionally, other privately funded projects of significant size are under way, through which many of the issues concerning photovoltaic utility applications can be addressed without Federal funding.

Mod-2 Status

Question: Would you please provide the Committee with a status report on the Mod-2 program?

Answer: Repairs and improvement modifications on the three turbines at Goldendale, WA. are nearly complete. Test operations of the full cluster are scheduled to begin again in April. A comprehensive test program is planned that will include studies on aerodynamic rotor performance and structural loads, both of which were different from those expected in earlier testing. These research operations are expected to continue into FY 1985.

Mod-5B

Question: What is the current status of the Mod-5B project?

Answer: The Mod-5B contractor, Boeing, has completed conceptual design and is currently in the detailed design phase. In 1983, Boeing initiated negotiations for a 50/50 cost-sharing agreement with the Government. Boeing is currently preparing a revised cost-sharing proposal that is anticipated in the next several weeks.

GE Withdrawal from Mod-5 Program

Questions: Would you explain the reasons for GE withdrawing from the Mod-5 program?

Answer: GE's stated reasons for withdrawing were the declining price of oil, lower forecasts of utility growth, the planned expiration of alternative energy tax credits, and an apparent decrease in investor interest in renewable energy sources.

Assistance to Smaller Wind Technologies

Question: Please discuss the activities proposed in FY 1985 which are directed at assisting smaller wind technologies.

Answer: The Rocky Flats Small Systems Test Center has facilities available to the small wind industry for fee-paid testing. This allows smaller companies the opportunity to perform systems tests on their machines that would not otherwise be possible due to high capital equipment costs and personnel requirements.

The Small Systems Test Center also engages in cooperative testing programs with manufacturers and users of small wind systems. For these tests, portable data acquisition systems are located on-site at a commercial wind project. The data collected and analyses performed are then available to both the manufacturers and to the Rocky Flats research team. In this way, both parties benefit from a relatively low-cost test program. Other responsible laboratories such as Sandia, Battelle Pacific Northwest Laboratories, and NASA also perform efforts with windfarm developers or small systems manufacturers. In addition to Rocky Flats-specific efforts, the generic aerodynamic and structural research proposed for FY 1985 supports small systems as well as larger ones because the technical issues, such as three dimensional airflow, dynamic stall, and turbulence, apply to all types of systems.

Small Systems Test Center

Question: Would you comment in detail on the need for $1.7 million for the Small Systems Test Center?

Answer: The Rocky Flats Small Systems Test Center performs generic research and provides manufacturers the opportunity to have experimental and analytical testing of their products performed on a fee-paid basis. The small wind turbine manufacturers are predominantly small businesses whose limited resources would preclude in-house prototype testing and fault identification. The funding requested is that which is required to maintain critical mass of technical support at the Center. Testing services provided include atmospheric performance testing, dynamometer testing for structural analysis, controlled velocity testing to evaluate a turbine's power curve, and data acquisition in field testing. The same technical staff who perform the tests are involved in generic research in aerodynamics, structural dynamics, systems studies and electric systems research such as variable speed generators.

Department of Energy funding is supplemented by the fee-paid testing as well as funding from other Government agencies. For example, the Department of Defense and State Department (U.S. AID) are beginning to draw heavily on Test Center capabilities.

Status of Repowering Design

Question: Congress has provided funding for repowering design activities over the last few years. What is the status of this effort? Why is no funding requested in FY 85?

Answer: Congress has appropriated a total of $12.5 million for repowering over the FY 1983 and FY 1984 time period. A Program Opportunity Notice (PON) was issued on March 31, 1983, for "Final Design and Subsystem/Component Testing for Solar Central Receiver Repowering Applications." In September 1983, the Department completed evaluations of PON submissions. A single cost-shared Final Design effort proposed by Rockwell International in conjunction with Pacific Gas and Electric and Bechtel National Inc., was selected as the proposal with the highest probability of success. It is expected that approximately $6.5 million will be required to complete the final design and other supporting activities. In addition, nearly $6.0 million will be required to support Subsystem/Component Testing by a consortium comprised of the following organizations; Babcock & Wilcox, Arizona Public Service, Martin Larietta, Black & Veatch, Southern California Edison Company, Olin Corporation, McDonnell-Douglas, Foster Wheeler and Stearns-Rodgers.

Since these activities have only recently been initiated and will not be completed until FY 1985 for the Final Design, and FY 1986 for the Subsystem/Component Testing, no additional funds are required for these activities. Further, DOE is supporting a great deal of research of a type which applies to the technology to be used in the repowering concept.

Second Small Community Experiment

Question: What is the current status of the Second Small Community Project?

Answer: The Program Opportunity Notice (PON) for the Small Community Experiments at Osage City, Kansas, and Molakai,Hawaii, was released in December 1983. Proposal were due and received at the DOE Albuquerque Operations Office on February 29, 1984. A Source Evaluation Board at Albuquerque is presently evaluating the proposals.

Parabolic Dish

Question: How much is requested in FY 85 for parabolic dish research and technology development? Please provide a breakdown.

Answer: In FY 1985, the Solar Thermal Technology budget request for parabolic dish research and technology is $9.38 million. These funds are for the following activities: dish electric module development $3.6 million, dish electric component and subsystem development $1.1 million, distributed receiver advanced concentrator R&D $2.28 million; Distributed Receiver Test Facility (DRTF) operation and maintenance $1.0 million, Small Community Experimental technical management support $0.4 million; and dish energy transport R&D $1.0 million.

Barstow Central Receiver

Question: What is the status of the 10 MW Central Central Receiver Project at Barstow, California?

Answer: The 10MWe Pilot Plant at Barstow has completed one and one-half years of the planned two-year test and evaluation phase. The three year power production phase will being in August, 1984.

Central Receiver R&D

Question: Explain the reduction in central receiver R&D?

Answer: Central receiver R&D is funded in FY 1984 at $19.98 million and the request for FY 1985 is $15.33 million. The major reductions result from decreased funding requirements during FY 1985 for the 10 MWe Pilot Plant and Repowering activities. Research associated with addressing longer term uncertainties regarding central receiver concepts has received increased emphasis in the FY 1985 program proposal.

Solar Buildings-Heat Transfer Analysis

Question: Explain the reduction in heat transfer systems analysis?

Answer: Research activities which can affect the control of solar gain, light admittance, and heat loss were among the highest priority recommendations of the Building Energy Research Workshop held in January 1983 at Carmel Valley, California, and jointly sponsored by the House Science and Technology Authorization Committee and organizations of the building industry. The proposed budget for the Solar Buildings Energy Systems shifts the primary emphasis from heat transfer systems analysis to aperture and thermal storage materials research which responds appropriately to recommendations of the Workshop.

Solar Energy Research Institute

Question: What role does SERI play in the overall Solar and Renewable Strategy? Are there plans to expand this role?

Answer: The Solar Energy Research Institute (SERI) began operation in July 1977 and functions as a Government-owned contractor-operated DOE laboratory to perform research, development, testing, and related functions as necessary to establish solar energy technologies as viable components of the national energy supply network.

Over the past few years, SERI has made substantial contributions to an increased understanding of the basic solar energy phenomena and the potential viability of several promising solar energy conversion technologies. SERI has matured significantly and is rapidly progressing toward national and international preeminence in solar energy and the related sciences. SERI will continue to serve as a solar research center of excellence for the foreseeable future.

Geothermal Loan Guaranty Program

Question: What is the status of the Loan Guaranty Program?

Answer: In a March, 1982 Federal Register Notice, the Department noted that pending applications exceeded the remaining loan guaranty authority of the Department, and therefore suspended applications for new projects for the foreseeable future. The Department has now made decisions on 9 of the 11 applications then pending, bringing the Government's total commitment and loan guaranties issued to $289.4 million under this program. Two applications are still in process, totalling $101 million. In addition, follow-on guaranties for the construction of revenue-producing power plants may be required for two existing Government-guarantied projects. Current planning thus anticipates the possible use of all available loan guaranty authority.

Hot Dry Rock

Question: Comment on the recent developments in the Hot Dry Rock project?

Answer: In December 1983, a massive hydraulic fracturing experiment was conducted at the Fenton Hill Hot Dry Rock Site in New Mexico. Nearly 6 million gallons of water were injected into 240° C crystalline rock at a surface pressure of 7,000 psi and at pumping rates in excess of 1,000 gallons per minute. Although the resulting fractures did not intercept the other well and thus produce a circulation loop, the total fractured region is very large, approximately 800 meter by 400 meters by 300 meters, and probably contains interconnected cracks throughout a volume of about 1/10 cubic kilometer. Plans are now underway for establishing a flow connection with this man-made geothermal reservoir, which could sustain a heat-removal rate of as much as 40 thermal megawatts over a 10-year period.

Deep Scientific Well

Question: Explain the importance of research involving the deep hydrothermal well.

Answer: The Department is proceeding with a competitive solicitation to drill or deepen a well in the Salton Sea geothermal area for scientific investigations with funds provided in FY 1984. Geothermal technology experiments and reservoir engineering studies are to be supported with FY 1985 funds requested. The total activities thus funded will include the engineering aspects of providing the deep hole and a number of cores, fluid samples, and measurements to characterize the geothermal potential of the borehole. This well provide the opportunity to gain understanding of the nature of potential reservoirs beneath known high-temperature hydrothermal reservoirs, and a chance to study rock-fluid interactions under physical and chemical conditions never before explored. Additionally, an increased knowledge of the genesis of ore forming minerals through analysis of high temperature, high-salinity brines is offered.

Geopressured-Methane

Question: What is the status of the Geopressured Methane program?

Answer: Two of the Department's geopressure design wells in Louisiana are undergoing flow testing. A third well, in Texas, is undergoing remedial work. The Department is negotiating with the Electric Power Research Institute for a cooperative experiment to generate electric power from heat content of the geopressured brine produced from one of these wells.

Energy Storage

Question: What is the reason for the reduction in thermal and mechanical storage?

Answer: The normal budget constraints dictated that the highest priority projects be funded. The hydrogen and thermal storage projects ranked highest; funding is proposed for these in the Department's FY 1985 request.

With respect to the other unfunded energy storage projects, our generic flywheel research has recently been completed, and other agencies are considering further work for their particular application (NASA and DOT). Regarding compressed air, the Compressed-Air Storage Facility at Pittsfield, Illinois, was transferred to the Electric Power Research Institute in FY 1984 for their confirmation testing. As a result, funds were not requested in FY 1985 for compressed-air storage. We now know that the concept of seasonal thermal storage appears doubtful in practice for large-scale applications mainly because of very uncertain environmental impacts. As a result, this project ranked lower in priority and funding was not requested to continue this work. The projects on hydrogen and thermal storage still show the potential for significant petroleum energy savings and were recommended for funding in FY 1985.

ELECTRIC ENERGY SYSTEMS RESEARCH

Question: Explain your plans for the phase down of the Hawaiian deep water cable project?

Answer: We are continuing the development of the Hawaiian deep water cable project. As you noted we have not requested funds for FY 1985 but that will not slow down this project. To date $10.8 million has been appropriated and the project has spent less than $2 million. Delays have slowed the spending, but they have also allowed a strengthening of the research and development plans. We will soon have the basic parametric studies from Hawaiian Electric Co. which will show the cable options as they relate to the potential choices for ships to deploy or retrieve the cable, and also as they relate to the sea route and its characteristics. We are optimistic that this work will produce a new level of technology useable in other deep water submarine cable installations.

Question: How much is requested for EMP research? What is the total cost of this effort? Explain in detail any action to ensure that this work does not duplicate other federal efforts.

Answer: The Department has requested $3 million for the electromagnetic pulse research in FY 1985. At this time I cannot tell what the total program will cost, but for a very good reason. We have designed this EMP research to be a careful, deliberate effort with numerous check points. After we understand how this unusual transient couples and interacts with the electric networks, we will assess what might be the probable damage level of such an event. From this we will adjust the program up or down to reflect that assessment. If it is shown that major damage could occur on certain electrical equipment, a test program with commensurate funding will be required to evaluate the impact and explore remedial options.

In a similar way we have painstakingly sought out the federal agencies involved, and interested, in EMP research. As your question implies, we also do not want to duplicate the work of others, but we did find that no other federal or private group is looking at the impact of EMP to the nations's transmission, distribution or electrical control facilities. Each agency we've talked to has encouraged us and supported our research plan. To date we are in contact with the Defense Nuclear Agency, the Air Force Weapons Lab, the Corps of Engineers, Federal Emergency Management Agency, Oak Ridge and Sandia National Laboratories, numerous universities, and all of the EMP research groups supporting the Defense Department. We invite these people to our contract reviews; they keep us informed on their work and provide the results of past research which may be relevant to the DOE effort in power systems impacts.

Increased Management Attention

Question: Discuss the Department's "increased management attention" to environmental and safety functions.

Answer: The recent realignment of functional responsibilities within the Department placed the Office of Environment, Safety and Health under the Assistant Secretary for Policy, Safety, and Environment. This change eliminated the previous split in management focus whereby the Assistant Secretary was responsible for both safety and environmental oversight as well as for several major outlay programs which required substantial management attention. The change has resulted in increased management attention to the Department's environmental programs and its nuclear and operational safety functions in headquarters by the Secretary and Program Assistant Secretaries and in the field by Operations Office Managers and Laboratory/Production sites' Directors. This in turn is expected to bring about an increased awareness and emphasis Department-wide on the safe, and environmentally sound operation of DOE activities.

Nuclear Safety Program Increase

Question: Comment on the need for the $5 million increase over the FY 84 levels for nuclear safety.

Answer: Of the total $5 million increase for the Environment, Safety, and Health Program, $4.7 million is directed to the nuclear safety component. To further amplify on what I said in my formal statement, this increase provides some expansion of the efforts in all categories of the nuclear safety component. These categories are identified in the breakout I have provided for the record and the principal increases are discussed below.

The largest increase is the $1,510,000 for emergency preparedness, which will go to expand the operational capability of the unique resources maintained by the Department to monitor and assess any accidental release of radioactivity from a nuclear operation. The increase will be directed largely to the comprehensive integrated remote sensing effort, which will provide extensive multispectral scanning, large format aerial photography and airborne nuclear radiometric information to characterize all DOE sites and to serve as baseline data for comparison in the event of an emergency.

The protection of the radiation worker is directly keyed to our ability to accurately measure his radiation exposure and environment. At the present time, some serious problems in the measurement technology continue to exist. Further, a scientific data base is necessary Department-wide to assist in countering the impracticability of recently proposed national/international standards and regulations. The experience of DOE at the laboratory level must be brought to bear to bring about more realistic standards and regulations. Finally, performance standardization in dosimetry instrumentation is essential to an upgraded DOE radiation protection program. The $1,220,000 increase in health physics will permit greater efforts in these critical areas.

The $940,000 increase in criticality safety is needed to establish a nuclear criticality safety program which has Department-wide applicability. Specifically, the funds would be used to update nuclear safety guides and documents, some of which are over 20 years old, to develop and maintain state-of-the-art computer computational techniques, and to validate an improved measurements capability. We believe these efforts have the potential for permitting significant reductions in safety conservatisms, without compromising the level of protection provided, as more reliable criticality safety information is developed and validated.

Initial efforts in the training program area after the Three Mile Island accident were directed at improvements in policies, requirements and guidelines for selection and training of reactor operations personnel. These efforts are to be continued with emphasis on improving the quality of reactor operator training programs. The $505,000 increase will be used to expand our efforts directed to the training of operating personnel for nonreactor nuclear processing facilities, which is equally important as those for reactor operations. Initiatives in this area will include the application of performance based training methods to chemical process operator training programs, development of generic training materials, and workshops for contractor training managers.

Funding for Operational Safety

Question: Please provide for the Committee additional justification for the increase in operational safety.

Answer: Increases in the Operational Safety budget for Safety and Health Protection ($+840,000) and for Performance Measurement ($+200,000) are to principally provide for: Development to proceed on a much needed health surveillance system having (a) the capability of giving timely warning of increased incidence of disease, and (b) the ability to quickly and effectively test and disprove hypotheses concerning health hazards where, in fact, no hazards exist. Efforts now underway, at the Lawrence Livermore National Laboratory to develop a computerized health records system, and, at the University of Washington to examine the epidemiological aspects and the medical events to be included in a surveillance system, would enter the pilot test phase.

An increase in the number of Safety Analysis Reports for Packaging (SARPs) which must be thoroughly reviewed by DOE to assure compatibility between DOE requirements and NRC/DOT/IAEA requirements for similar operation, with which DOE is obligated to comply, and the incorporation of voluminous new DOT and IAEA regulations into DOE requirements necessary to stay in step with NRC/DOT and IAEA.

Inadequate regulations could damage DOE credibility in transportation safety, slow down and/or seriously reduce the numbers of DOE radioactive material shipments, and adversely affect programs. Technical support for Pu02 packaging leak test measurements and Pu compounds to meet immobilation criteria will also be developed.

The initiation of two new fire protection research projects. One concerns the influence of fire upon ventilation systems for critical areas and will involve the use of the Full Scale Fire Test Facility at the Lawrence Livermore National Laboratory. The objective is to verify the combination of previously developed ventilation and fire models. The second will evaluate fire risks in control rooms of reactor, accelerators, etc., to people and operations. Technology transfer to other agencies, private sector, etc., will continue with publication of the final Fusion Fire Protection Report.

The execution of three tasks that are needed to bring DOE industrial hygiene policy and guidance up to the state-of-the-art level. These tasks are to be performed by the Los Alamos National Laboratory covering, (a) the preparation of a guide on the design, testing, and use of laboratory hoods which would reconcile the occupational health requirements with the published energy conservation criteria, (b) an indepth review of the Design Guide (DOE Order 6430.1), introducing up-to-date occupational health criteria, and (c) the development of a new chapter on industrial hygiene and personal protective clothing for the DOE Explosives Safety Manual.

The operation of four additional environmental safety and health computer systems to track and analyze various performance indicators. The average annual operating cost for each system is $50,000.

QUESTIONS SUBMITTED BY SENATOR DECONCINI

Solar Program Budgets

Question: Can you please provide for the Committee a breakdown in funding for solar energy programs under the Department of Energy for fiscal years 1981 through 1985.

Answer: We will provide that information for the record.

(Information follows)

U.S. DEPARTMENT OF ENERGY

SOLAR ENERGY RESEARCH FUNDING—FISCAL YEARS 1981–85

[Budget authority in thousands]

Program elements	FY 1981	FY 1982	FY 1983	FY 1984	Requested FY 1985
Solar buildings	$68,600	$22,100	$11,650	$16,450	$11,885
Photovoltaics	133,200	74,000	58,035	50,400	47,500
Solar thermal	120,020	55,950	49,500	43,850	37,500
BioFuels	45,200	30,500	21,000	28,400	28,100
Wind energy	54,200	34,400	31,400	26,500	23,300
Ocean energy	34,600	20,800	10,500	5,500	3,500
Crosscutting activities and program direction	15,986	30,474	19,850	10,550	11,864
Total solar energy	471,806	268,224	201,935	181,650	163,649

Repowering

Question: How much money is available in the FY 84 and FY 85 budgets for repowering? If the FY 85 level is less than the FY 84 level, please explain the rationale for such a change in funding.

Answer: The FY 1983 and FY 1984 appropriations provided a total of $12.5 million for repowering activities. In FY 1984, $5.0 million has been applied towards a cost-shared repowering final design (Pacific Gas & Electric/Rockwell International) and cost-shared subsystem/component development (Babcock & Wilcox). No funds have been requested for FY 1985. These efforts are scheduled for completion in FY 1985 and FY 1986 respectively, previously appropriated funds are sufficient to complete these activities.

Pacific Gas & Electric Repowering

Question: Has the Pacific Gas & Electric repowering project, which obtained Federal funds last year to complete a final design, been prematurely forced into commercialization? Please explain.

Answer: The Pacific Gas and Electric repowering project was funded under the Program Opportunity Notice entitled "Final Design and Subsystem/Component Testing for Solar Central Receiver Repowering Applications". The proposal requested DOE participation in the Final Design activity and required no Department participation in post-design construction activities. In our view, the proposal represented Rockwell International and Pacific Gas & Electric's belief that the design activity would sufficiently address areas of uncertainty to enable proceeding with construction.

Repowering Third Pary Financing

Question: It is my understanding that the PG&E project receiver Federal assistance under the agreement that the contractor would receiver third-party financing for commercialization. Has PG&E made any progress in achieving third-party financing and do you believe the PG&E project will be successful in receiving private sector support to establish commercial applications?

Answer: The 30 MWe Central Receiver Carriza Plains Project is a joint undertaking of the Department of Energy, Rockwell International, Pacific Gas & Electric and Bechtel National, Inc. Under the cooperative agreement with Rockwell International, the Department is a participant in the final design of the facility. All future post design activities will be conducted by the participants with no DOE assistance. The participants, along with ARCO Solar, Inc., have completed a draft venture formation plan and are presently finalizing the details of the proposed venture.

Alternative Rewpowering Concepts

Question: Does the Department believe there is a need to continue an examination of alternatives such as the molten salt concept if repowering technology is not at a stage where it is mature enough to attract private financing?

Answer: The conventional water/steam Rankine cycle technology for central receiver power plants has been demonstrated at the Barstow 10 MWe Pilot Plant and there is fair assurance that water/steam technology can be scaled up to commercial size. Molten salt and sodium technology are less advanced and may require more tests like the Molten Salt Electric Experiment before remaining technical uncertainties can be resolved.

Repowering Commercialization

Question: Absent Federal participation, what do you foresee holds for repowering commercialization?

Answer: As is frequently the case with relatively new technology, a great deal of change has occurred and is occurring in market conditions. Forecasting the future for renewable technologies is nearly impossible to perform with any lasting credibility and is a complex undertaking which would require the use of a very large number of unsupportable and arbitrary assumptions. The short term prospects for the type of technology employed in the repowering designs depends upon a number of general economic factors such as interest rates and inflation, as well as, energy prices and the availability of energy tax credits. However, the solar thermal technology appears promising within the longer terms energy marketplace.

Alternative Technologies for Utility Applications

Question: Approximately how much would it cost and how long would it take for the Department to continue to examine alternative technologies and bring them on line in a utility-sized plant within a well-designed program which considers the maturity of the technology and a sound approach to financing? Would the Deparment be inclied to do so? Why or why not?

Answer: The Department has continuing Solar Thermal Technology program that is conducting research and development on alternative technologies. These alternatives are central receiver, parabolic dish, and parabolic trough technologies for electrical, industrial process heat, and photo/thermochemical applications. Central receiver water/steam technology for electric power plant applications has been demonstrated at the 10 MWe Pilot Plant. Therefore, its maturity is well advanced. Other central receiver technologies and applications are much farther behind and require more R&D. Parabolic dish technologies are still in the R&D stage with no clear definition of their future in the nation's energy picture. Parabolic trough technology appears to be marginally competitive in specialized markets.

How long it would take and at what cost to bring industrial or utility-size plants on line in a commercial environment with a sound approach to financing, can be answered only by the industrial/utility and financial communities. It is a function of whether they percieve the maturity in the technology, the risks acceptable, tax credits, energy costs, and venture capital sufficient, and return on investment adequate. It is also a function of future fossil fuel cost, avoided energy expenses, and other competitive technology developments.

However, the Department's research and development programs directed toward technical risk and cost reduction, combined with increased emphasis on technology transfer, are expected to be adequate in assisting industry in commercializing solar thermal technology in the future.

SUBCOMMITTEE RECESS

Chairman HATFIELD. Thank you. We will now stand in recess until tomorrow at 2:30 in this room when the committee will review the nuclear fission program.

[Whereupon, at 2:42 p.m. Tuesday, March 6, the subcommittee was recessed to reconvene at 2:30 p.m. Wednesday, March 7.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

WEDNESDAY, MARCH 7, 1984

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:38 p.m. in room SD–192, Dirksen Senate Office Building, Hon. J. Bennett Johnston presiding.

Present: Senators Johnston and Huddleston.

DEPARTMENT OF ENERGY

NUCLEAR ENERGY R&D, URANIUM ENRICHMENT, AND NUCLEAR WASTE MANAGEMENT PROGRAMS

STATEMENT OF SHELBY T. BREWER, ASSISTANT SECRETARY FOR NUCLEAR ENERGY

ACCOMPANIED BY:

- **FRANKLIN E. COFFMAN, DIRECTOR, OFFICE OF TERMINAL WASTE DISPOSAL AND REMEDIAL ACTION**
- **GORDON L. CHIPMAN, JR., DEPUTY ASSISTANT SECRETARY FOR BREEDER REACTOR PROGRAMS**
- **JOHN LONGENECKER, DEPUTY ASSISTANT SECRETARY FOR URANIUM ENRICHMENT**

Senator JOHNSTON. The hearing will come to order.

This afternoon we will continue our examination of the fiscal year 1985 budget request for the Department of Energy. The purpose of this hearing is to receive testimony on the nuclear fission, uranium enrichment, and nuclear waste programs.

On behalf of the subcommittee, I welcome as our principal witnesses Dr. Shelby T. Brewer, Assistant Secretary for Nuclear Energy, and Dr. Michael J. Lawrence, Acting Director, Office of Civilian Waste Management.

PREPARED STATEMENT

Dr. Brewer, your full statement will be included in the record, and please proceed.

[The statement follows:]

STATEMENT OF SHELBY T. BREWER

Mr. Chairman and Members of the Subcommittee, I am pleased to be here today to discuss the Department of Energy budget for nuclear fission energy programs. Our Energy Supply research and development funding request for FY 1985 is $590.4 million in budget authority, as compared to the $663.3 million appropriated in FY 1984. The funds requested are distributed among the major program elements as indicated in the following table:

Program Element	FY 1984	FY 1985
	($ in Millions)	
Converter Reactor Systems	$ 92.7	$ 83.5
Breeder Reactor Systems	423.2[a]	308.1
Advanced Nuclear Systems	34.1	33.5
Remedial Actions	99.0	152.0
Nuclear Waste Technology	14.3	13.3
Subtotal Energy Supply R&D	663.3	590.4
Uranium Enrichment	2,193.8[b]	1,675.3
Uranium Enrichment Revenues	-2,105.0	-1,675.3
Subtotal (Net)	$ 88.8	$ 0
Total	$ 752.1	$ 590.4

[a] Includes $40 million transferred from the Uranium Enrichment Program for Clinch River Breeder Reactor termination.

[b] Includes $130 million of deferred funding; excludes $40 million transferred for Clinch River Breeder Reactor termination.

Note: The FY 1984 numbers reflect comparabilities.

Before describing these program elements in detail, I will comment briefly on a number of the external factors that have influenced the preparation of our FY 1985 budget.

The past year has been a complex mixture of successes and disappointments for nuclear energy. We have a President who strongly supports nuclear power and recognizes it as an essential element of a balanced energy supply for the future. In 1983, three new nuclear powerplants achieved commercial operation status, raising the annual output of nuclear-generated electricity to almost 300 billion kilowatt-hours, or about 13 percent of our total electrical generation. Nuclear power continues to provide us with safe, clean energy. The economics of plants operating today are on a par with coal, and substantially more favorable than oil or gas. In spite of this impressive performance, nuclear power is not considered an attractive investment by the electric utility industry. Six plants were cancelled in 1983 -- and four more were either cancelled or indefinitely delayed in January of this year. In addition, no new plants have been ordered since 1978. The fact that this disturbing situation is the result of complex and interrelated economic, regulatory, and institutional problems, rather than any deficiency in the technology, is of little practical consequence. While we are seeing a daily improvement in economic indicators that gives us some hope of renewed investment, as yet that hope has not materialized. To dwell on our defeats, however, is counterproductive. We must now turn to new and alternative strategies for ensuring future nuclear vitality. With this challenge in mind, we have formulated the budget request that we are presenting to you today.

Our proposed programs are supportive of the President's nuclear policies and are entirely consistent with the Department's National Energy Policy Plan (NEPP-IV) sent to Congress last fall. Our goal of ensuring that nuclear power remains a viable option for a balanced and diverse energy resource base contributes to the national goal of fostering an adequate supply of energy at reasonable costs. Important elements of this balanced system are new advanced technologies to provide adequate energy supplies well into the future. Our programs support the policy of minimizing Federal control and involvement in energy markets. Accordingly, all nuclear research and development will be conducted with an eye to transferring the technology to the private sector for demonstration and deployment as soon as is feasible.

We interpret our role as one of extending the nuclear technological horizon in order to create private sector opportunities for commercializing and marketing those concepts that best meet their needs. In addition, we must continue to fulfill the Federal responsibility for maintaining public health and safety and environmental quality in regard to all nuclear-related activities under our jurisdiction.

We have been keenly aware of the institutional problems that confront the current generation of commercial nuclear power -- light-water reactors. The utilities are not committing capital for the construction of any large powerplants, be they nuclear or coal. Unless and until the fundamental problems that result in unacceptable business risk for the utilities are resolved, there will be few if any orders for new, large powerplants of any kind. The consequence of this is electricity costs that are higher than necessary. For industries where electricity costs make up a substantial portion of their business expenses, such as the aluminum industry, this will result in a serious deterioration of their competitive position in the world market and/or the necessity to expand outside the United States with the attendant loss of jobs in this country.

In some areas, utilities are turning to imports of Canadian nuclear electricity as a near-term expedient to reduce their supply costs. Unfortunately, these solutions reflect our inability as a Nation to solve the fundamental problems confronting the electric utility and nuclear industries today. The commercial nuclear power industry in the United States has taken over a quarter of a century and hundreds of billions of dollars to develop. The Nation must consider seriously the effects that would be attendant upon a continued decline and ultimate demise of this industry.

We have analyzed carefully what steps the Federal Government could and should take to effect solutions that would renew confidence in the nuclear option. A priority emphasis will be placed on continued efforts to encourage passage of nuclear licensing reform legislation. The outdated system currently in use was established 25 years ago. A more predictable process is badly needed to ensure efficient licensing and regulation of the plants already in operation or under construction. It is also a prerequisite for a renewal of utility interest in nuclear investment.

On March 18, 1983, DOE sent to Congress its legislative proposal for improving the regulatory and licensing process for nuclear powerplants, with the following three major objectives:

- To provide for continued improvement in the safety of nuclear powerplants
- To improve the effectiveness of public participation
- To provide a more stable and predictable licensing process.

The NRC also submitted a proposal for licensing and regulatory reform. It is important to note that the Administration's proposals are not an attempt to resolve the debate over the need for nuclear power or its desirability when compared with other energy sources. Nuclear licensing reform is a necessary but not sufficient condition for new nuclear powerplant orders. The proper role of nuclear power in the Nation's energy future should be decided by the free market system, but it cannot receive proper consideration if we continue with an inefficient and outmoded Federal regulatory process.

Mr. Chairman, I would now like to highlight some of the major elements of our FY 1985 nuclear program.

Converter Reactors

In addition to our effort to contribute to the resolution of problems confronting the nuclear industry, in FY 1985 the Department will also be evaluating alternative, advanced design concepts. There is a need to develop the technology for reactors that have less complicated safety systems and better economics, thereby increasing both public and utility confidence. We will also be evaluating the potential of small High-Temperature Gas Reactors for unique domestic and international markets. Where appropriate, we will conduct collaborative programs with Japan and the Federal Republic of Germany. This is one of a number of areas in which we will be pursuing increased international cooperation in technology development.

The Converter Reactor Program also supports the cleanup at TMI. As you know, DOE has limited its effort to performing generic research and development that can contribute substantially to our knowledge of both accident recovery and accident prevention. We believe that important technical progress is being made, but activity is impeded by a shortfall of required funds. The nuclear industry, through the Edison Electric Institute, pledged support for the cleanup, with a target of $150 million. At least $100 million is required before funds can be transferred to General Public Utilities, the TMI owner. To date, only $80 million has been pledged, but a recent favorable ruling by the Internal Revenue Service, which makes pledges tax deductible, is expected to generate additional funds. Although the DOE commitment to the TMI cleanup remains firm, it now appears that our FY 1984 and 1985 expenditures will be less than planned, due to slower than expected progress by the other parties involved in the effort.

Breeder Reactor Systems

Our FY 1985 request for Breeder Reactor Systems reflects the major restructuring that has taken place in the breeder program. While our overall goal remains the same -- to develop the technology for introduction of a marketable breeder reactor by the private sector early in the next century -- our strategy has changed. Last year, our activities were project-oriented, based around Clinch River construction and operation. With the termination of Clinch River, our program focus has shifted to resolving those technical issues that stand in the way of commercialization by industry. We understand breeder technology; the United States still has the greatest technological base for breeders in the world, and we know it will work. The challenge now is to make it commercially viable. That can be done only if the cost of the product is brought in line with the cost of its competition and if it can be made attractive (i.e., safe and reliable) to both the customer and the public. And this challenge must be faced in light of new realities regarding Federal support for energy development. While the Federal Government will continue to be needed to provide certain institutional and financial support, large capital outlays are not practical or appropriate in the budgetary and political environment we face. Nor are they likely to be practical for some time to come.

The challenge, then, is to develop a breeder concept that can be built by the private sector on an economical basis, with the Federal Government playing a strong but limited role. In fact, during the past year, we have encouraged and supported industry to develop advanced reactor designs aimed at meeting sound economic, reliability, and safety criteria.

The Clinch River Project has produced valuable experience in the areas of design, component testing, and licensing. This information will be retained for use in the restructured base technology program. NRC's Atomic Safety and Licensing Board recently issued a memorandum of findings which resolved all issues in the CRBR Construction Permit hearings in favor of the Applicants. This decision, which would have been sufficient to authorize the issuance of a construction permit provides firm conclusions regarding the safety and environmental acceptability of breeder reactors and provides a benchmark for future breeder licensing efforts. Clinch River Project closeout activities are proceeding smoothly. An appropriation transfer of $40 million has been made from the Uranium Enrichment Program as an interim measure to fund CRBRP termination requirements. No new appropriations are expected to be requested in FY 1985.

The LFMBR research and development program in FY 1985 will be directed toward improving the technology for power conversion systems, components, instrumentation, and materials technology to the point where cost reduction and reliability potentials are realized. Continued operation of the breeder test facility complex at the Hanford Engineering Development Laboratory (HEDL) and the Energy Technology Engineering Center (ETEC) will provide the experience base and test capability for this effort.

The program will also assess advanced breeder concepts that offer the potential of improved economics and safety. These studies will include investigation of smaller scale breeders, standardized designs, and reactors manufactured as a complete package or as modules in central fabrication facilities. They will be conducted with input from industry, the ultimate customer for breeders. Moreover, cooperative research with, and technology transfer to, the private sector will constitute an important element of development activity.

Another priority element of our program will be a substantial increase in international cooperative effort. We see significant benefits to be gained from the division of workload and the pooling of resources. We also anticipate that joint effort will encourage uniform or compatible safety standards, physical security measures, and safeguards.

In FY 1985, we will continue development of the breeder fuel cycle technology as well as confirmation of fuel breeding in a light-water reactor using the uranium-233 fuel cycle. Our breeder fuel cycle program, however, will be conducted at a substantially lower level of effort. The lower funding recognizes the reduced requirements in both pace and extent for breeder fuel cycle technology development as a result of the Clinch River termination. It is my personal belief that this is a period of reassessment and that circumstances will evolve that will signal the need for more aggressive development of the breeder fuel cycle.

Advanced Nuclear Systems

Another important area of Department activity is the research and development of advanced nuclear systems in support of U.S. military and civilian space missions and other special applications. Work is divided into two major subprograms. The first is the Special Isotopic Power Sources Program. In FY 1985, flight systems development, production, and safety support will be conducted for isotopic power generators to be used in the Galileo and International Solar Polar spacecraft to be launched by NASA in 1986. Design efforts for an advanced modular generator to be used in space missions and for other special applications will be continued. A second program element is the Space Nuclear Reactor Program, which is a cooperative effort of the DOD, NASA, and DOE to examine several reactor concepts for potential use in future space missions.

Waste Technology

As you know, Mr. Chairman, under the requirements of the Nuclear Waste Policy Act of 1982, the activities associated with the siting, construction, and operation of a national repository system for high-level nuclear waste were assigned to the newly established Office of Civilian Radioactive Waste Management. Prior to that, in 1980, legislation was enacted stating that the responsibility for disposal of low-level nuclear waste rests with the States. My role in nuclear waste management is to develop waste treatment technologies for the long-term management, storage, and disposal of civilian radioactive waste, be it low-level, high-level, or transuranic. In FY 1985, one of our activities will be to conduct safety and reliability tests on the ceramic melter system that is used to solidify high-level wastes. We will also continue to provide technical assistance to the States in their efforts to establish (either individually or by regional compacts) facilities for low-level waste disposal. In this regard, I am pleased to report that progress in forming compacts has been encouraging. To date, four compacts await Congressional approval and two more have been approved by the required number of States (four) in each region to permit submission to Congress.

Remedial Actions

Another important Federal responsibility in the management of nuclear wastes is our program for remedial actions at certain contaminated facilities and sites. This program is divided into four major subprograms: (1) The Formerly Utilized Site Remedial Action Program (FUSRAP) covers former nuclear processing sites that require stabilization or removal of contaminated material. DOE currently has authority for conducting remedial action at 19 sites. In FY 1985, remedial action will be completed at the Niagara Falls Storage Site in New York, and work will continue at other sites for which DOE has authority. (2) The Uranium Mill Tailings Remedial Action Program (UMTRAP) is directed toward the cleanup of 24 inactive uranium mill tailings disposal sites and several thousand associated vicinity properties. In FY 1985, cleanup will be completed at the site in Canonsburg, Pennsylvania, and about one-third of the necessary work at the Salt Lake City, Utah, site and about two-thirds at the Shiprock, New Mexico, site will be completed. (3) A third program covers our participation in a Federal/State cooperative effort to remove uranium mill tailings used for construction purposes in Grand Junction, Colorado. By the end of FY 1985, we will have completed remedial actions at 623 of the 626 structures requiring attention. (4) The Surplus Facilities Program provides for the safe management and disposition of contaminated DOE civilian program facilities (currently grouped into about 55 projects) that are no longer in use. In FY 1985, dismantlement of the Shippingport Atomic Power Station will be initiated, which will demonstrate the safe and economical cleanup of a commercial power reactor.

Yet another waste management activity for which we have responsibility is the demonstration of high-level waste solidification at the Western New York Nuclear Center, near West Valley. In FY 1985, the West Valley Program will focus on vitrification testing, engineering, and procurement of waste solidification support systems and decontamination and decommissioning of the facility.

Uranium Enrichment

I have saved discussion of one of the Department's business enterprises -- the Uranium Enrichment Program -- for last. The FY 1985 enrichment request, which represents a 24 percent reduction from the FY 1984 appropriation, supports a program approach that is substantially changed from that of previous years. This major departure from "business as usual" operations has been necessitated by a series of events and circumstances that have threatened the ability of the United States to remain a viable long-term supplier of uranium enrichment services.

When I appeared before this Committee last year, I described the complex and interrelated problems that were frustrating the attempts of the Department to be a competitive supplier of enrichment services. Decreased demand and the worldwide excess of enriched uranium (the current inventory of enriched uranium is sufficient to meet the requirements of the next 3 years without additional production); increasing competition from foreign enrichment suppliers (Urenco and Eurodif); the emergence of a secondary market; and the major shift in foreign currency exchange rates have all taken a heavy toll on our enrichment enterprise. Underlying and aggravating these problems has been the failure of the U.S. Government to operate the enrichment enterprise in a businesslike manner.

In response to this untenable situation, the Department of Energy has developed a strategy designed to reverse the erosion of the U.S. enrichment market share. Today I am prepared to describe this strategy, which I believe will enable us to survive this transition period and to emerge in a commanding financial and technological position.

Basic to our effort is a fundamental change in management philosophy. The monopolistic mindset that has prevailed since the early days of the enterprise must yield to an attitude of healthy, aggressive competition. Enrichment operations can no longer be driven by an undisciplined, pie-in-the-sky production strategy. Rather, decisions must be responsive to the realities of the marketplace.

The overall objectives of the Department's revised enrichment strategy are as follows:

1. To be responsive to the needs of our customers.
2. To be a reliable long-term supplier at predictable prices.
3. To offer enrichment services at the lowest reasonable price, based on sound business practices.
4. To operate the enrichment complex without Federal subsidy.

In meeting these objectives, the Department is focusing on several interrelated elements that must be initiated in tandem. The first element -- and it is prerequisite to the others -- is to stabilize the U.S. enrichment market. Our primary vehicle for doing so is the issuance of a new Utility Services Contract. This contract, we believe, is both responsive to customer needs and cognizant of the DOE requirement for stable and predictable revenues. A second element of our strategy is to plan and conduct the activities in all areas of the enrichment enterprise more efficiently and more cost-effectively. And finally, when we are assured of our market position, we intend to initiate actions to encourage a greater degree of private sector participation in new investments.

After consultation with many knowledgable sources -- most particularly, our enrichment customers -- the Department issued the new Utility Services Contract on January 18th. The key features of the contract are:

- A reduced price ($135/SWU) for separative work, with a long-term price ceiling

- A customer option to offset up to approximately 30 percent of requirements by purchases either from the secondary market or from foreign suppliers
- Shorter leadtimes (180 days) to confirm delivery quantities
- Flexibility to select a variable tails assay option.
- Flexibility to terminate contracts with no termination charges, provided 10 years advance notice is given to the Department.

Overall, the new contract offers significant advantages to our existing customers and to prospective new customers. Fixed Commitment Contract customers have the opportunity to convert to a contract with a substantially shorter fixed commitment period, to gain partial relief from their existing contractual future-year delivery commitments, and to work off their existing inventories. Requirements Contract customers will benefit from the lower price and from the ability to purchase a portion of their requirements from the U.S. and foreign secondary markets at even lower prices. In addition, Requirements Contract customers could use the variable tails assay option, which they currently cannot do.

Since the new contract is based on customer needs rather than on fixed commitments, we would not continue to feed the secondary market. To the contrary, the ability to purchase up to 30 percent of requirements from the market would work away excess SWUs, and it is conceivable that the secondary market could dry up as early as 1986. Future price adjustments would be based on known economic indicators, thereby ensuring predictability in the cost of enrichment services.

The reaction to the new contract by both foreign and domestic enrichment customers has been most encouraging. Representatives of the Edison Electric Institute, whose members include the vast majority of DOE's enrichment customers, testified before

Congress last month concerning the Department's Utility Services Contract. They commented as follows:

> ". . . we are encouraging our members to give the US contract the serious consideration it is due . . . . The new contract appears to be beneficial to the domestic ratepayers, to the balance of trade for the Nation, to achieving an enrichment program that is responsive to the overall market needs, and to encourage the proper allocation of limited Federal resources."

On February 6, I signed the first Utility Services Contract with Duke Power, with a value of over $2 billion in future sales. Duke elected to purchase 100 percent of its requirements from DOE. In addition, four other utilities have submitted letters of intent to convert to the new contract. During discussions with a large number of utilities regarding the specifics of converting existing contract forms to the US Contract, a significant number (25) have indicated their interest in conversion. As of February 22, approximately 40 to 45 percent of DOE's enrichment customers had indicated their intention to convert, pending resolution of specific conversion terms and their concerns regarding existing contractual commitments. We believe these actions indicate that the new contract has every likelihood of obtaining a high rate of conversion.

The key to remaining competitive in the enrichment marketplace is to offer a contract with favorable price and flexible terms. Continuation of the previous production-driven strategy, with large outlays for Gaseous Diffusion Plant (GDP) operations, Gas Centrifuge Enrichment Plant (GCEP) construction, and the development of advanced technologies, would have produced a cumulative cash flow deficit of approximately $2 billion by 1990, severely impairing our ability to finance these activities. The earlier strategy was also raising serious concerns about our prediction of price stability or price reductions in the long term. The new market-driven strategy employs a vigorous cost reduction program with two major components.

The first component involves the operation of existing production capacity. The Department is making an earnest attempt to obtain relief from high power costs, to reduce outlays for GDP operations, and to operate the existing complex in the most cost-efficient manner possible. After the extent of conversions to the Utility Services Contract is determined, we will make an assessment as to how many GDPs should be operated, what their operational mode should be, future power purchases, reduction of program overhead, etc. These decisions cannot and should not be made until hard market data are in hand, but our strategy includes a firm commitment that we will pursue effective cost control in both the near and long term. This commitment is illustrated by the offer of a cost ceiling in the new contract.

The second cost control element relates to future investment decisions, including the level of research and development and the construction of new capacity. These decisions will also be market driven. In the near term, our strategy includes a continued commitment to develop and deploy new technologies for uranium enrichment. The funding level and pace of these programs, however, will be based on a more businesslike approach of adjusting outlays in proportion to revenues. As demand for separative work increases, the amount of money available for research and development on advanced technologies will also increase. Conversely, decreases in the DOE sales base would mean decreased activity and longer leadtimes for developing advanced technology options.

In the near term, we plan to continue research and development work on both the advanced gas centrifuge (Set V) and the Atomic Vapor Laser Isotope Separation (AVLIS) processes. A detailed evaluation is underway that will assess the technical feasibility and economic potential of both options. The Department's objective is to determine at the earliest possible date which of the two should be pursued through the demonstration and deployment stage. We believe that we will be in a position to make this decision in mid-FY 1985. Recently, we have begun the process of establishing detailed evaluation criteria with the help of the advanced gas centrifuge and AVLIS program participants. We also plan to place an independent third party under contract in the very near term to assist us in the evaluation. The technology option that is not selected may continue to be developed at a reduced pace, to assure that a fallback alternative exists.

Our FY 1985 budget reflects this approach, with research and development expenditures set at about 9 percent of expected revenues. In future years, total research and development expenditures will be based on development needs and available revenues.

With regard to new capacity, the Department intends to proceed in FY 1985 with construction of GCEP Process Buildings 1 and 2 and procurement of Set III centrifuges. Construction beyond Process Buildings 1 and 2 will be determined by responses to the new contract and results of the technology selection. We are now rescoping the GCEP project to minimize overall project costs, particularly the outlays for procurement of Set III machines. This course of action allows the pace for completion of GCEP to be driven by the marketplace. It also offers the potential for improved GCEP economics through greater use of the more efficient Set V machine (provided its development is successful) in the first two buildings.

As mentioned previously, another consideration in our strategy is to finance future capacity additions like GCEP by private sector contribution to the greatest degree possible. This will assure that those who benefit from the new technology will also bear its cost. Realistically, we believe that this element must await a more stable market position and the presence of a long-range planning base. The information to support long-range decisions will be available when the period for contract conversions closes, in September of this year. Accordingly, it is our objective to present specific recommendations for increased private sector participation to the Congress in concert with our FY 1986 budget request.

In summary, Mr. Chairman, the nuclear programs we are describing today differ markedly from those of the past. We have acknowledged the realities of the marketplace and have introduced modern principles of good business into our programs. In recognition of the constraints of the current national fiscal policy, we have set strict priorities for sharply focused activity. And we have a clearer delineation of government/industry responsibilities. One thing that has not changed, however, is our belief in a strong nuclear option and our commitment to strive for its realization. We look forward to working with this and other committees of Congress in achieving this objective.

I would now like to describe in greater detail the Department's nuclear programs.

Converter Reactor Systems

The FY 1985 budget request for Converter Reactor Systems is $83.5 million, a decrease of $9.2 million from the FY 1984 appropriation. The distribution of funds is as follows:

Program Element	FY 1984 ($ in Millions)	FY 1985 ($ in Millions)
Light-Water Reactor Systems	$ 19.5	$ 16.0
High-Temperature Reactors	30.0	34.6
Advanced Reactor Systems	5.0	0.0
Three Mile Island Activities	37.0	32.2
Program Direction	1.2	0.7
Total	$ 92.7	$ 83.5

Note: The FY 1984 numbers reflect comparabilities.

The overall goals of the Converter Reactor Systems Program are: (1) to improve the economic and safe use of nuclear reactors; (2) to contribute to the resolution of the nuclear industry's regulatory, financial, and institutional problems; and (3) to fulfill the Federal Government's research and development commitment associated with General Public Utilities' cleanup of Three Mile Island (TMI).

Light-Water Reactor Systems

The Advanced Reactor Evaluations element of our program will focus on safety in improved advanced converter reactors. While the current LWR industry has an outstanding safety record, improvements can be made to any technology. The basic question of how changes in the current size and design of commercial converter reactors could improve safety (both real and perceived) and better meet utility needs will be addressed by this program.

The Department will continue to fulfill its role of reviewing and reporting to Congress on the national research and development programs conducted by private sector and government organizations, as required under P.L. 96-567.

We will also continue participation in the Loss-of-Fluid Test (LOFT) Program, an internationally funded activity under the auspices of the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development (OECD). This consortium selected a test program to be carried out over a 3-year period beginning in FY 1983. During that year, three thermal-hydraulic tests were successfully performed within budget and ahead of schedule. In FY 1984, the final three thermal-hydraulic tests will be completed, and preparations will be made for two fission-product release and transport tests. These fission product tests, to be performed in FY 1985, will provide important data relevant to the magnitude of the radioactive source term, which is a significant input to the technical basis underlying many nuclear licensing and regulatory requirements. By early FY 1987, all analysis should be completed and the LOFT reactor deactivated and decontaminated.

The original cost estimate for the LOFT Program was $93.5 million. Of this, NRC provided $25 million in FY 1983, DOE is providing $45 million in increments of $15 million in FY 1984, 1985, and 1986, the Electric Power Research Institute is contributing $1.5 million, and foreign countries are expected to contribute $22 million.

High-Temperature Reactors

Following completion in FY 1984 of activities related to the design of a proposed large high-temperature gas-cooled reactor (HTGR), efforts in FY 1985 will be refocused to evaluate the potential of small HTGRs for unique domestic and international markets. In addition, the development of the technology base needed for HTGR electric and process heat applications will be supported. These activities and objectives are consistent with the current policy of support for long-leadtime, high-technology advanced concepts that cannot be fully supported by the private sector.

The primary thrust of this program will be to evaluate and develop the potential of small gas-cooled reactors for multiple applications. Technical and economic design assessments will be performed to guide the base technology development activities and the selection of a reference small reactor concept. The technical approach is to utilize the inherent lower power density of small HTGRs to minimize the need for engineered safety features. The evaluation and development of the HTGR concept will be closely coordinated with appropriate user groups to assure evolving marketplace compatibility. Alternative market, business, and financial strategies will be developed by the users, consistent with their needs and requirements, in order to guide the evaluation of the small HTGR and the configuration of the HTGR which best meets the needs of the market.

The HTGR program will also emphasize the advancement of the technology base needed to support the development of small, gas-cooled reactor systems with less complex safety systems. Additionally, technology activities will be performed to address many of the technical design safety issues that have been identified from the operational experience gained at Fort St. Vrain, from changes in nuclear regulation, and from changes in user (utility) requirements.

Advanced Reactor Systems

In FY 1984, efforts have continued on irradiation testing of candidate replacement low enriched uranium (LEU) fuel systems and fabrication development to qualify commercial sources of these alternative fuels. In FY 1985, funding for this program is not being requested by the Department of Energy; however, the Arms Control and Disarmament Agency has requested funding to support this activity in FY 1985.

Three Mile Island Activities

The Three Mile Island (TMI) Program is budgeted under the Converter Reactor Program but is managed under the Office of Terminal Waste Disposal and Remedial Action, and is discussed under that section of this statement.

Breeder Reactor Systems

The Breeder Reactor Systems budget request for FY 1985 is $308.1 million, a decrease of $115.1 million from the FY 1984 appropriation. Distribution of the funds is as follows:

Program Element	FY 1984 ($ in Millions)	FY 1985
Clinch River Project Termination	$ 40.0[a]	$ 0
Liquid Metal Fast Breeder Reactor	300.8	261.6
Nuclear Fuel Cycle	35.4	11.9
Water-Cooled Breeder	35.5	26.3
Program Direction	11.5	8.3
Total	$ 423.2	$ 308.1

[a] An Appropriation Transfer of $40.0 million has been made from Uranium Enrichment as an emergency interim measure to fund immediate CRBRP termination requirements.

Note: The FY 1984 numbers reflect comparabilities.

Liquid Metal Fast Breeder Reactor Program

The Liquid Metal Fast Breeder Reactor (LMFBR) Program has been restructured to focus on resolving those technology issues that are key to improved breeder economics and predictable, safe performance. The revised program will be fully consistent with our National energy research and development policy, in that there will be no new Federally funded demonstration projects. The responsibility for commercialization of breeder reactor technology, including definition of program scope, timing, funding arrangements, and management, resides with the private sector. The Federal program for FY 1985 complements industry efforts by emphasizing:

- Technology research and development necessary for a breeder system that has less complicated safety systems, is reliable, is competitive with alternatives, and meets the market needs of utilities
- Development of advanced plant concepts,
- Major, substantial international collaboration, and
- Development of LMFBR fuel cycle technology.

A major effort will be directed toward advancing the technology for power conversion systems, components, instrumentation, and materials technology, as well as for the related fuel supply system, to the point where cost reduction and reliability potentials are realized. Testing of breeder systems, fuels, components, instruments, and materials takes place at the Hanford Engineering Development Laboratory (HEDL), the Energy Technology Engineering Center (ETEC), and the Argonne National Laboratory (ANL).

Recent studies indicate that advanced breeder concepts can be economically competitive with alternatives (e.g., LWRs and coal plants) and deployed with relatively short leadtimes in sizes matched to various grid requirements. The feasibility of these advanced breeder concepts will be assessed with input from the user industry, the ultimate customer for breeders. Explicit attention will be given to the potential advantages of smaller reactors of standard design that are capable of being replicated in total (or by module) in central fabrication facilities. Smaller sized fuel cycle facilities also have attractive economies to match plant sizes. Cooperative research with, and technology transfer to, the private sector will constitute an important element of the reoriented breeder program.

A major thrust of the FY 1985 program will be the emphasis on international collaboration in breeder technology to reduce U.S. program costs and to retain the U.S. role in international nuclear forums. The experience gained in design, component testing, licensing, and analysis from the CRBRP Project, as well as our advanced breeder knowledge acquired from the operation of the Fast Flux Test Facility (FFTF) and the base program, will be valuable in establishing exchange agreements with other nations.

A smaller scale effort, the Water-Cooled Breeder Program, is devoted to proving that breeding can be achieved in a light-water reactor using the uranium-233/thorium fuel system. Efforts in FY 1985 will continue the defueling activities and core evaluation of the light-water breeder core from the Shippingport Atomic Power Station.

Clinch River Breeder Reactor Project

There were no funds appropriated to continue the Clinch River Project in FY 1984. Therefore, on November 10, 1983, the parties involved -- the Department of Energy (DOE), Tennessee Valley Authority (TVA), Commonwealth Edison, Project Managment Corporation (PMC), and the Breeder Reactor Corporation (BRC) -- agreed to terminate the project, effective November 14, 1983. The agreement was formalized on December 19, 1983.

Termination activities began in early FY 1984 and are planned for completion in early FY 1985. These include the termination and/or relocation of project personnel; termination of contracts and subcontracts; site redress work; settlement of terminated contracts and subcontracts; documentation of certain completed work; completion of selected computer verification efforts that were approaching completion when the project was terminated; arrangement for retention and appropriate availability of scientific and technical information generated under the project;

storage, maintenance, relocation of CRBRP components, equipment, materials, etc., for use within the LMFBR Program and other Government programs, as appropriate; and disposition of inventories not of value to the LMFBR Program.

Large-Scale Prototype Breeder

The Government-sponsored design efforts on a Large-Scale Prototype Breeder (LSPB) plant will be phased out in an orderly manner during FY 1984. The program has been a joint effort of the U.S. Government and private industry to develop a large-scale prototypical breeder demonstration plant. The plant was to have been the logical follow-on to the Clinch River Project as a full-scale demonstration plant. The LSPB design will be maintained as a frame of reference for benchmarking advanced concepts developed under the base program.

LMFBR Base Program

The mission of the LMFBR Base Program is to develop the requisite technology to the point where the private sector is able to construct and operate safe, reliable liquid metal fast breeder reactor plants for supplying electricity to the grid. This includes studies of the technical features applicable to future private sector initiatives. The program has been reoriented to place primary emphasis on designing less complicated safety systems and achieving economic competitiveness in future advanced concepts. It is to this end that the breeder technology and test facilities efforts discussed in the following paragraphs are directed.

Concepts and Requirements Development. An effort will be initiated to identify plant concepts that could be developed by industry for use in the marketplace and to assess unique market needs that can be satisfied by the breeder technology program.

During FY 1985, development efforts on the advanced concept studies will be conducted by contractors selected during FY 1984 as part of a competitive procurement process. This effort will include development of plant requirements and safety criteria; safety analyses; licensing assessments; seismic evaluation; constructability assessment; identification of research and development requirements; and analysis of cost and schedule potential. Market analysis will be conducted to assure proper program and concept development. The studies will utilize to the maximum extent possible previously developed technology and information gained under current international collaborations, including the DOE-Japanese MONJU agreement. Research and development requirements will be constantly coordinated with other parts of the base program.

Beginning in FY 1984 and during FY 1985, an information exchange will be conducted with the Nuclear Regulatory Commission (NRC), aimed at developing licensing criteria for future advanced LMFBRs. Key LMFBR issues will be identified and used as a basis for improving the licensability of LMFBRs and contributing to an efficient licensing process.

Power Conversion Technology. It is essential that major cost reduction and reliability potentials are realized in order to justify investor and public acceptance to build and operate economically competitive LMFBRs. The Power Conversion Technology Program focuses on these potentials and encompasses the power conversion systems and the components necessary to convert heat to electricity. Standardized plants and more cost-effective methods for achieving quality assurance are two concepts of special interest for accomplishing the reduced cost and increased reliability goals.

The research and development to improve the performance predictability and reliability of power conversion components include flow-induced vibration analysis, flow distribution testing and analysis, mixing and stratification testing and analysis, subcomponent development and testing, fabrication process development, inspection development, and procedure development. Efforts are underway to develop data on materials properties, including fabrication and environmental effects. Documentation of these data in handbook form will serve as an authoritative source for use in the design and licensing processes. The program also includes the development of a new ferritic alloy that offers significant economic and engineering advantages over current reference structural alloys.

Significant accomplishments for FY 1984 include: successful completion of sodium testing of the 35,000 gpm pump, which disclosed the need for modifications that would not otherwise have been discovered; successful completion of sodium testing of the hockey stick steam generator in both the recirculation and once-through modes; and successful completion of water testing of the 85,000 gpm two-stage prime pump, preparatory to shipping all pump system parts to ETEC by the end of 1984.

Specific accomplishments planned for FY 1985 include: to continue preparations for sodium testing of the helical coil model steam generator; to develop a 14,000 gpm electromagnetic primary sodium pump for modular reactor applications; and to initiate balance-of-plant cost reduction, simplification, and standardization studies. Fabrication of the 70 MWt double-wall tube steam generator will continue, with delivery in FY 1986. Development of this component has the long-term potential for eliminating the intermediate sodium system and avoiding the need for a sodium-water reaction product separation system.

Fuel Performance and Supply. The objectives of the Fuel Performance and Supply Program include proving the performance of fuel, blanket, and absorber core components under prototypic operating conditions and demonstrating safe, reliable, and licensable core systems. Specific objectives include extending the lifetime of core components to a minimum of 3 years; automating fuel fabrication to achieve competitive fabrication costs; improving safeguards and reducing personnel exposure; and transferring developed technology to industry.

The development of carbide and metal fuels for advanced and smaller sized plants will proceed because of the potential advantages in smaller control requirements, smaller sizes, and lower fuel cycle costs that these fuel systems offer. International participation in the Core Systems and Materials Program will continue to reduce program costs while maximizing technological benefits.

In the fuel supply area, activities will continue toward completing the Secure Automated Fabrication (SAF) line. Procurement of equipment and its installation in the Fuels and Materials Engineering Facility (FMEF) will continue. Upon its completion and operation in the late 1980's, the SAF line will demonstrate breeder fuel fabrication technology that can be deployed commercially by industry. Activities for fuel assembly capability in the FMEF will be initiated in FY 1985.

Nuclear Systems Technology. The disciplines of safety, physics, structures, thermal hydraulics, and reactor core design are integrated into a single, cohesive unit in the Nuclear Systems Technology Program. The program will focus on experimental verification, in existing DOE facilities, of the feasibility of advanced reactor concepts of varied design, size, and fuel type that exhibit self-terminating capability under failure conditions. All functions needed to assure nuclear safety under abnormal conditions are integrated into the nuclear systems. Demonstration of inherently safe operation of nuclear systems will reduce the requirements for supporting auxiliary equipment whose purpose is to control otherwise dangerous conditions. Such support equipment substantially increases the complexity of reactor designs. These studies will enable the development of a reliable advanced technology that is competitive and compatible with user needs and capabilities.

Varied fuel types (metal, oxide, carbide) and fuel pin sizes will be evaluated, as well as the effects of varied core designs on voiding, temperature, and reactivity coefficients. Features supporting inherently safe operation will be developed, reflecting the redirection in the safety program, which places more emphasis on the existing safety features of breeders and less on breeding ratios and other plant parameters.

Work will continue in support of upgrading the TREAT reactor to provide the principal in-reactor safety phenomena testing capability. Also, a program of operational safety experiments on integrated systems will be conducted at the EBR-II reactor facility.

Test Facilities. The test facilities effort consists of operating and maintaining facilities at the Hanford Engineering Development Laboratory (HEDL), the Energy Technology Engineering Center (ETEC), and the Argonne National Laboratory (ANL) to meet LMFBR program test requirements. In addition, the Los Alamos National Laboratory (LANL) conducts nuclear-related studies and assessments in support of the program.

HEDL Facilities

The Hanford Engineering Development Laboratory (HEDL), which is operated by Westinghouse Hanford Company in Richland, Washington, plays a key role in breeder reactor development and testing activities. The major test facility at HEDL is the Fast Flux Test Facility (FFTF), which provides a test bed for demonstrating and evaluating the performance of breeder reactor fuel assemblies and partial core loadings at reference conditions. Efforts will focus on operation of the FFTF and the installation of the Secure Automated Fabrication line equipment.

Facilities operated at the HEDL site include:

- The FFTF, which is a 400 MWt liquid metal (sodium) cooled fast neutron flux loop-type reactor designed specifically for irradiation testing of nuclear reactor fuels and materials for fast breeder reactors.

  The performance of the FFTF during 1983 and 1984 is particularly noteworthy: three full cycles of operation were completed. The reactor was operated for a nominal 100 days during each cycle and, in the third cycle, experienced 55 days of continuous full-power operation without interruption. The performance of the fuel subsystem exceeded its design goal burnup of 85,000 megawatt-days per tonne during the third cycle, without failures.

- The Fuel Storage Facility, located adjacent to the FFTF, is used to store and remove decay heat from irradiated FFTF fuel and reactor experiments.

ETEC

The Energy Technology Engineering Center (ETEC), which is located 40 miles northwest of Los Angeles and is operated by Rockwell International, is the breeder program's non-nuclear component testing center. ETEC has several large on-site non-nuclear sodium testing facilities with the unique capability to test fast breeder reactor components under all operating conditions. Some smaller ETEC facilities will be used for testing of selected small reactor plant components, instrumentation, and subsystems. Efforts will continue toward realizing innovative methods for economical long-term steam generator testing.

ANL Facilities

The Argonne National Laboratory (ANL) efforts are primarily accomplished at the ANL West (ANL-W) site at the Idaho National Engineering Laboratory. These activities include plant and component operating experience in addition to specific testing efforts in support of fuel performance and nuclear systems technology.

Development of innovative methods to achieve economical long-term testing of key components such as pumps, steam generators, and inherent safety features is a continuous effort in parallel with testing activities.

Facilities that are operated at the ANL-W site include:

- The Experimental Breeder Reactor II (EBR-II)
- The Hot Fuel Examination Facility (HFEF)

- The Zero Power Plutonium Reactor (ZPPR)
- The TREAT (Transient Test) Reactor.

Los Alamos National Laboratory (LANL)

The LANL efforts are primarily general program and nuclear studies and assessments and nuclear training activities.

Initiatives in support of cost-effective operations are being implemented throughout the test facilities complex. Cost and schedule controls ensure efficient use of the test facilities; consolidation of testing and demonstration activities is continuously under review. Facilities surplus to base program needs will be phased out.

Nuclear Fuel Cycle

The fuel cycle activities include development of advanced technology for reprocessing of irradiated fuels from nuclear power reactors, with emphasis on the more stringent requirements associated with reprocessing of breeder reactor fuel. These include higher thermal and radiation burdens, higher fissile content, sodium contamination, and more complex fuel assembly structures. The technical program is focused on development of technology that will provide smaller-scale facilities for equivalent throughput, reduced radiation exposure to workers, increased environmental protection, increased reliability, enhanced safeguards, and reduced costs.

In FY 1984, design, fabrication, and testing of advanced, smaller size, higher throughput equipment in the Integrated Equipment Test (IET) facility at Oak Ridge will continue to evaluate performance and remote maintenance concepts. Specific items to be tested include fuel disassembly and shear systems, a continuous rotary dissolver, centrifugal contactors for solvent extraction, and an advanced servomanipulator needed for remote operations and maintenance.

In FY 1985, remotely operable and maintainable reprocessing equipment and systems will be developed, and some integrated cold testing in the IET facility will be conducted. Laboratory and hot cell experiments on flowsheet development will continue at a reduced level. Efforts in FY 1985 will also include providing supporting analysis and evaluation for the light-water breeder reactor proof-of-breeding demonstration and evaluating methods and cask designs for the handling and shipping of irradiated breeder fuel.

Water-Cooled Breeder

The mission of the Water-Cooled Breeder Program is to develop technology for significantly improving the efficiency of nuclear fuel resource utilization by light-water reactors used for electrical power generation. The objective is to accomplish the following: to prove that breeding can be achieved in a light-water nuclear reactor using the uranium-233/thorium fuel system; to confirm a practical way to use thorium (a plentiful source of fuel for which there has been no major energy-related use); to show the feasibility of installing pre-breeder and breeder cores of the light-water breeder reactor type in existing and future pressurized-water reactor plants, using current types of plant components and systems; and to make the technology developed under the program available to industry.

A light-water breeder core was installed in the Shippingport Atomic Power Station in 1977. On October 1, 1982, the Shippingport Station ceased power operations. End-of-life testing was performed, and defueling of the light-water breeder reactor core was begun.

Core removal operations are scheduled to be completed by the end of FY 1984. Major activities in FY 1985 will include: completing documentation of core removal operations; preparing for long-term storage of expended fuel; and shipping of spare and physics fuel rods to storage.

Core evaluation work in FY 1985 will include: disassembling light-water breeder core fuel modules for examination and storage; providing facilities and equipment for light-water breeder fuel module examination and assay; preparing fuel rods for nondestructive assay; performing proof-of-breeding work; analyzing effects of extended core operation on core materials; and continuing thermal and hydraulic analysis of light-water breeder reactor components.

Advanced Nuclear Systems

The Advanced Nuclear Systems budget request for FY 1985 is $33.5 million, a decrease of $0.6 million from the FY 1984 appropriation. Distribution of the funds is as follows:

Program Element	FY 1984	FY 1985
	($ in Millions)	
Special Isotopic Power Sources	$ 27.7	$ 28.0
Advanced Systems Evaluation (Space Nuclear Reactor)	5.0	4.5
Program Direction	1.4	1.0
Total	$ 34.1	$ 33.5

Note: The FY 1984 numbers reflect comparabilities.

The goal of the Advanced Nuclear Systems Program is to develop and deliver specialized nuclear power sources for U.S. military and civilian space missions and other special applications. Activity is conducted within two program elements: the Special Isotopic Power Sources Program and the Space Nuclear Reactor Program. The latter is a tri-agency cooperative endeavor of DOD, NASA, and DOE.

The Advanced Nuclear Systems Program supports civilian and military space applications through the development of a range of nuclear power system options. A number of developed nuclear isotopic power sources are used by the Department of Defense and the National Aeronautics and Space Administration; operating data from these systems are being reviewed. For example, Pioneer 10 (launched in 1972) and Pioneer 11 (launched in 1973) continue to transmit telemetry data which indicate that the space isotopic power supplies are operating as designed. In addition, the DOD Lincoln Experimental Satellites 8 and 9 (in orbit since 1976) and the NASA Voyager 1 and 2 spacecraft (launched in 1977) continue to obtain their total spacecraft power needs from their onboard isotope generators.

The current generation of Radioisotopic Thermoelectric Generators (RTGs) under development will deploy the General Purpose Heat Source (GPHS) for the NASA Galileo and International Solar Polar Missions, planned to be shuttle-launched in 1986. Each GPHS RTG weighs 123 pounds and produces about 285 We.

Special Isotopic Power Sources

The FY 1985 isotope power development program has three major activities. First is the readiness and shipment of the GPHS flight units to be used in the silicon-germanium generator for the NASA Galileo and International Solar Polar Missions. The second effort is the development of a new modular RTG concept that offers the potential for a more advanced, much lighter generator, i.e., high specific power to weight ratio, for future space missions. During FY 1985, ground demonstration system (GDS) fabrication and assembly will be accomplished. The third activity involves RTG development for special military applications. In FY 1985, emphasis will be placed on the GDS fabrication, completion of final design definition, and the safety evaluation of the RTG.

Advanced Systems Evaluation (Space Nuclear Reactor)

The Space Reactor Development Program and the Space Power Advanced Reactor Program were consolidated to form the Space Nuclear Reactor (SP-100) Program, to support a Memorandum of Agreement signed on February 11, 1983, by the DOD's Defense Advanced Research Projects Agency, NASA's Office of Aeronautics and Space Technology, and DOE's Office of Nuclear Energy. The agreement establishes the relative responsibilities of the three agencies during the conceptual development phase of the program. In FY 1984, several reactor system concepts are being examined to determine which concept would enhance or enable future civilian and military space missions. Long lead efforts in technology development and related tasks began in 1983 and will continue through 1985. A key decision is planned during FY 1985 on whether to proceed with a ground engineering prototype demonstration. If a decision is made to proceed to a prototype, substantial increases in funding will be necessary in FY 1986 and beyond for the ground engineering test, for associated facilities improvements at a DOE laboratory or contractor location, and for the transition of the program into more detailed design and development activities.

The current multi-agency agreement expires at about the end of FY 1985. A new agreement will be necessary if a decision is made to proceed to the SP-100 Ground Engineering Test Phase (FY 1986-1989). Upon selection of a specific system for the final development, the management structure will be changed to a more traditional line structure with separate activities and clearly defined interfaces for each agency. DOE will be responsible for developing the nuclear subsystem during this phase.

During FY 1985, several reactor development system contractors will be funded in order to develop reactor conceptual designs for space system applications. Conceptual designs will be developed, and a baseline, backup, and growth design will be completed. System and nuclear safety program activities are to be continued in preparation for potential ground engineering systems tests scheduled for FY 1986.

Remedial Action Program

The FY 1985 budget request for the Remedial Action Program is $152.0 million, an increase of $53.0 million over the FY 1984 appropriation. The distribution of funds among the program elements is as follows:

Program Element	FY 1984	FY 1985
	($ in Millions)	
Formerly Utilized Sites	$ 17.0	$ 16.0
Grand Junction	1.5	1.5
Uranium Mill Tailings	27.9	54.0
Surplus Facilities	15.5	30.0
West Valley	36.0	49.4
Program Direction	1.1	1.1
Total	$ 99.0	$ 152.0

Note: The FY 1984 numbers reflect comparabilities.

The overall objective of the Remedial Action Program is to treat or stabilize radioactive wastes and perform required decontamination and decommissioning at contaminated DOE and legislatively authorized nongovernment facilities and sites. The major activities are: (1) the Formerly Utilized Sites Remedial Action Program (FUSRAP); (2) remedial action at Grand Junction, Colorado (P.L. 92-314, as amended); (3) the Uranium Mill Tailings Remedial Action Program (UMTRAP) for inactive uranium mill tailings sites (P.L. 95-604); (4) management of certain radioactively contaminated Department facilities declared surplus and resulting principally from civilian nuclear energy programs; and (5) demonstration of the solidification of high-level radioactive wastes at West Valley for final disposal (P.L. 96-368).

Formerly Utilized Sites Remedial Action Program (FUSRAP)

FUSRAP provides for remedial actions at former nuclear processing facilities, most privately owned, which became radioactively contaminated from Manhattan Engineer District or Atomic Energy Commission activities and which have not been decontaminated sufficiently to meet current health effects guidelines. To remedy the situation, the contamination will be either stabilized in place, with restrictions placed on use of the site, or removed and disposed of at another location. Authority derived from the Atomic Energy Act of 1954, as amended, currently exists for conducting remedial actions at 15 sites. This authority is based on our review of the involvement of agency predecessors in activities at these sites. Review of other sites involved in past activities of the agency's predecessors is continuing and may result in the addition of sites to the program. Congress added four new sites and $5.0 million in the FY 1984 Energy and Water Development Appropriations Act with direction to initiate, as a priority action, a decontamination research and development project at these sites and vicinity properties, bringing the program site total to 19. The Department's Oak Ridge Operations Office has the lead for implementing the program.

In FY 1984, we expect to complete much of the cleanup work for contaminated properties near the DOE-owned Niagara Falls Storage Site at Lewiston, New York. Other remedial actions on this site will be described in my testimony on the Surplus Facilities Program. We are also planning to complete remedial action at the Middlesex Landfill, New Jersey, and at the University of Chicago, Illinois. Material contaminated with uranium will be excavated from the Middlesex Landfill and stored temporarily at the nearby DOE-owned Middlesex Sampling Plant. At the University of Chicago, about 600 cubic feet of contamination in several laboratories will be removed and sent to the DOE disposal site at Hanford, Washington.

Preparations are underway to begin decontamination actions at Maywood, New Jersey; Wayne/Pequannock, New Jersey; Colonie, New York; and Hazelwood, Missouri -- sites which were added to the program in FY 1984. Cleanup of residential properties at Maywood and Wayne/Pequannock is scheduled to begin in March 1984, at Colonie in May 1984, and at Hazelwood in July 1984. Our general approach to these projects is to give priority to cleanup of contaminated vicinity properties and to store the waste temporarily on each processing site. We also will take steps to prevent any further offsite contamination from these four sites. For the longer term, the Congressional direction is to decontaminate the sites. Because of the large volumes of waste involved, we have asked each of the three States in which the waste is located to designate a site for disposal within the State. DOE would then proceed to acquire the site and effect disposal. These actions are expected to require more than 10 years to complete, at total costs exceeding $100 million. Due to the large quantities of material and the large costs associated with relocation, we will examine from the technical, environmental, and economic viewpoints the alternative of stabilizing the wastes at their present locations for two of the sites (Maywood and Colonie) and report the results to Congress.

Other survey, preliminary engineering, and environmental review activities are underway for the Albany Research Center at Albany, Oregon; the DuPont plant at Deepwater, New Jersey; and the Middlesex Sampling Plant at Middlesex, New Jersey. We are also continuing to monitor the Palos Park site in Illinois and the St. Louis Airport Storage Site in Missouri.

In FY 1985, the cleanup of contaminated properties near the Niagara Falls Storage Site at Lewiston, New York, will be completed. We will continue the priority decontamination projects at Maywood, Wayne/Pequannock, Colonie, and Hazelwood. Cleanup of the residential properties in Maywood, the adjacent properties in Rochelle Park and Colonie, and Latty Avenue in Hazelwood will be completed, and work will start on other vicinity properties. Design engineering and environmental analysis will be completed for the Albany, Oregon, site.

Grand Junction Remedial Action Program

Under Title II of Public Law 92-314, Congress authorized financial assistance to the State of Colorado to limit radiation exposure resulting from the use of uranium mill tailings for construction purposes in Grand Junction, Colorado. This State/Federal cooperative effort with the State of Colorado is administered by the Colorado Department of Health through the Grand Junction Area Office. The remedial action provides for removal of uranium mill tailings from the premises of about 626 structures where radon daughter exposures exceed the Surgeon General's guidelines. Public Law 95-236 extended the time for property owners to apply for inclusion in the program, which has now expired, and increased the authorized program funding. Federal funds cover 75 percent of the program costs, with the State providing the balance. FY 1986 is expected to be the last year in which Federal funds will be requested for the program.

Through FY 1983, work had been undertaken on 543 structures. In FY 1984, the program will continue with radiological assessments and will initiate remedial actions at about 50 structures. In FY 1985, the program will initiate and complete remedial action on 30 additional structures, for a total of 623 structures out of the 626 to be completed.

Uranium Mill Tailings Remedial Action Program (UMTRAP)

UMTRAP is responsible for conducting remedial actions at 24 former processing sites and several thousand contaminated vicinity properties as mandated by Public Law 95-604, "The Uranium Mill Tailings Radiation Control Act of 1978." Nine of the sites are designated as high priority, six as medium priority, and nine as low priority. The Act requires completion of the program within 7 years of the March 1983 promulgation of standards by the Environmental Protection Agency. Based on the results of an evaluation to assess the feasibility and budget impact of the mandated 7-year schedule, the Department has concluded that this schedule can be maintained. Project implementation is proceeding under baseline cost and schedule estimates that are consistent with the March 1990 completion date.

The current strategy is to focus near-term program activities on the higher priority sites and vicinity properties. Remedial actions are being conducted in accordance with cooperative agreements negotiated with the affected States and Indian Tribes. Federal funds cover 90 percent of the remedial action costs (100 percent for those sites on Indian lands). The type of remedial action for the processing sites will be either to stabilize the mill tailings in place, where feasible, or to remove the tailings to a new Federally owned disposal site. Engineering plans and environmental documents will be prepared for the cleanup and disposal operations at each site. The concurrences of the NRC and the affected State or Tribe are required for each site remedial action plan. The program also includes the cleanup of contaminated vicinity properties. It is estimated that 5,000 to 6,000 vicinity properties, mainly in the Grand Junction area but not covered by the Grand Junction Program, may be found eligible for cleanup. The Albuquerque Operations Office has the lead role in implementing this program.

Specific accomplishments planned for the balance of FY 1984 include the continuation of remedial action at Canonsburg, Pennsylvania, and initiation of remedial action at Salt Lake City, Utah. The Salt Lake City schedule has been adjusted to reflect the plans to relocate the tailings to a site near Clive, Utah. Cleanup also will continue at high priority vicinity properties near the Canonsburg, Salt Lake City, and Grand Junction sites and will be started at Edgemont, South Dakota, and Durango, Colorado. Remedial action plans will be completed, with State or Tribe and NRC concurrences, for Shiprock, New Mexico, and Gunnison, Colorado, and will be initiated for Durango, Colorado; Riverton, Wyoming; Lakeview, Oregon; Tuba City, Arizona; and Mexican Hat, Utah.

During FY 1985, the work on the Canonsburg processing site and on the remainder of the 125 vicinity properties will be completed. The work at Salt Lake City will be brought to 30 percent completion, and remedial action will be started at Shiprock and Durango. Approximately 215 vicinity properties, located at several high priority sites, will be cleaned up.

Surplus Facilities Program

This program provides for the safe management and disposition of the inventory of surplus radioactively contaminated DOE-owned facilities from civilian nuclear energy development programs. The decontaminated facilities and sites are returned to other productive use where appropriate. All defense-related facilities are included in the Defense Nuclear Waste Management budget. The facilities are grouped into about 55 projects under this activity. In addition, the program develops improved methods for decontamination and decommissioning which can be transferred to industry. A long-range plan will be completed by the end of FY 1984 to establish the overall schedule and priorities for sites currently in the surplus inventory. Priorities are established and work schedules are developed through the analysis of legal, economic, and health and safety factors for each site. The Richland Operations Office has the lead field office role in implementing the program.

In FY 1984, the major onsite cleanup and upgrading of storage facilities will be completed at the Niagara Falls Storage Site near Lewiston, New York. Work to recondition contaminated facilities will continue at the Mound Laboratory in Miamisburg, Ohio. This 10-year project, which is equally funded by this program and by the Assistant Secretary for Defense Programs, began in 1978 and will be 61 percent complete by the end of FY 1984. Responsibility for the Shippingport plant will be taken over from Naval Reactors after all of the fuel has been shipped to the Idaho National Engineering Laboratory. Project offices will be established on the site by DOE and by the General Electric Company, which was selected in 1983 as the decommissioning operations contractor. Other activities in FY 1984 will include completion of an action plan for work to be done at Monticello, Utah. A geohydrologic study and an engineering analysis of alternatives for long-term management of the Weldon Spring site in Missouri will be completed, and a draft environmental impact statement (EIS) will be initiated. Decommissioning of several contaminated buildings at Argonne National Laboratory will also be completed.

In FY 1985, the decontamination and dismantling of plant systems at the Shippingport Atomic Power Station will be initiated. The United States has proposed to the Nuclear Energy Agency that this be conducted as a limited cooperative project;

details of the cooperation are under discussion. DOE will assure transfer of this technology to U.S. industry by providing opportunities for participation and by making the experience from the project widely available.

At the Niagara Falls Storage Site, the capping of the stored residues will be completed, the final EIS will be completed, and a DOE decision on the long-term management of these contaminated materials will be made. The decontamination and renovation of facilities will be continued at the Mound Laboratory, and the project will reach 72 percent completion. Other activities in FY 1985 will include: removal of contaminated material and systems at Santa Susana, California; completion of the environmental review process for the uranium mill tailings site at Monticello, Utah; issuance of a draft EIS for long-term management of the uranium and thorium wastes stored at Weldon Spring, Missouri; removal of the TRIGA reactor vessel at the Center for Energy and Environmental Research in Mayaguez, Puerto Rico; and the decommissioning of Building 38 at Argonne National Laboratory.

West Valley Demonstration Project

The objective of the West Valley Demonstration Project is to demonstrate the solidification process for disposal of high-level nuclear wastes under the provisions of Public Law 96-368, the West Valley Demonstration Project Act of 1980. An integrated production-scale development and demonstration project for treating the high-level liquid nuclear wastes at the Western New York Nuclear Service Center, near West Valley, will be carried out.

Major activities to be performed as part of the project include: (1) decontamination required to prepare existing facilities and equipment to accommodate the solidification project; (2) removal of the wastes from the underground storage tanks; (3) development, design, construction, and operation of systems and necessary supporting facilities for the solidification of the wastes;

(4) acquisition of containers for the permanent disposal of the solidified waste; (5) temporary storage and transportation of the solidified waste to an appropriate Federal repository for permanent disposal; (6) decontamination and decommissioning of the waste tanks, facilities, hardware, and material used in carrying out the project; and (7) disposal of low-level and transuranic wastes produced from the project activities.

The total cost of the project is now estimated to be $381.5 million (unescalated) through waste solidification (exclusive of final decontamination and decommissioning of the facility).

In FY 1984, the major emphasis is on construction and decontamination. We plan to complete 60 percent of the construction of the Vitrification Component Test Stand; procure the test stand melter, canister turntable, and other key components; complete hardware procurement and installation and begin testing of waste mobilization and removal equipment in a one-sixth scale waste tank model; complete verification testing for supernate processing equipment; and complete decontamination of four radioactive areas and develop procedures for several more hot areas.

The funds requested for FY 1985 will be used to test and adapt installed equipment to support the beginning of supernate processing in April 1987 and sludge processing in September 1988. In particular, the program will complete and operate the Vitrification Component Test Stand; initiate design for conversion of the test stand to radioactive operation; complete decontamination of priority hot cells; and initiate procurement of supernate treatment, low-level waste treatment, and nuclear waste assay equipment.

Nuclear Waste Technology

The FY 1985 budget request for the Nuclear Waste Technology Program is $13.3 million, a decrease of $1.0 million from the FY 1984 appropriation. The funds are distributed among program elements as follows:

Program Element	FY 1984	FY 1985
	($ in Millions)	
Low-Level Waste	$ 8.2	$ 6.5
Waste Treatment	5.6	6.3
Program Direction	0.5	0.5
Total	$ 14.3	$ 13.3

Note: The FY 1984 numbers reflect comparabilities.

The goal of the Nuclear Waste Technology Program is to develop acceptable technologies for the treatment of civilian radioactive wastes. The major activities are: (1) the Low-Level Waste Program, which provides technical assistance to States to develop regional capability for the disposal of low-level radioactive waste; and (2) the Waste Treatment Program, which develops nuclear waste treatment processes and waste forms suitable for transportation, storage, and disposal in a geologic repository.

Low-Level Waste

Public Law 96-573, the Low-Level Radioactive Waste Policy Act, assigned States the responsibility for disposal of commercial low-level radioactive waste (LLW) generated within their borders. The formation of regional compacts to carry out this responsibility was encouraged by the law. The goal of the Department's LLW Program is to assist States in the development of an effective national LLW management system by 1986 and to evaluate this system in terms of operational efficiency by 1988. DOE involvement in active LLW disposal sites will also be completed by 1988.

During FY 1984, the LLW Program will complete the development of a regional LLW data base and continue its demonstration in compact regions; continue State/regional technical and financial assistance; and initiate disposal site stabilization and closure demonstrations at existing closed sites. The program is cooperating with the Office of Civilian Radioactive Waste Management to develop criteria and procedures for implementing the LLW site transfers to DOE, as called for in the Nuclear Waste Policy Act of 1982.

In FY 1985, the LLW Program will provide technical and financial assistance to a limited number of regions to support selection and operation of a new LLW disposal facility; support the correction of problems and stabilization at an existing disposal site; and support the utilization of advanced or innovative methods for the treatment of LLW.

Waste Treatment

The objective of the Waste Treatment Program is to develop and demonstrate technologies for the treatment and immobilization of nuclear fuel cycle radioactive wastes in forms acceptable for transportation, storage, and ultimate disposal in a licensed repository. Specifically, high-level, transuranic, and sodium-contaminated wastes are addressed. Over the years, methods for treating high-level and transuranic wastes have been developed. This program is now focused on determining the long-term reliability and maintainability of improved prototypical waste treatment systems and on testing and selecting acceptable waste forms for storage or permanent disposal in licensed facilities. The adequacy of these technologies is being demonstrated through their application to specific Department waste treatment efforts, such as those at West Valley and Three Mile Island. Activities in this program are coordinated with other Departmental efforts related to fuel reprocessing; generation of special wastes; transportation; and terminal isolation of Department and commercial wastes.

In FY 1984, waste solidification activities will focus on vitrification process controls and quality verification methods for demonstrating that glass waste products meet required specifications. Specifications for transuranic wastes will be completed, and transuranic waste treatment process development will continue. Criteria and guidance for shallow land burial of sodium-contaminated wastes will be field-tested and verified, with a final program report to be issued in 1985.

Activities in FY 1985 will determine the operational reliability, safety, and process control flexibility of the ceramic melter system for solidification of high-level radioactive wastes. A series of ceramic melter system design, testing, operation, and decommissioning handbooks will be developed to aid future waste treatment users. Transuranic (TRU) waste treatment technology will be evaluated and further developed. Planned activities include assessment of treatment options; evaluation of nonradioactive treatment techniques; and conduct of radioactive tests. In addition, several proposed transuranic waste treatment research and development programs involving the actual treatment of existing TRU-contaminated equipment in commercial plants will be evaluated. Evaluation of methods for treating spent nuclear fuel for interim storage and permanent disposal in a geologic repository will be initiated. Planning and evaluation of candidate materials and processes for a second generation, advanced waste form for high-level wastes from less aged nuclear wastes anticipated after the year 2000 will be conducted.

Three Mile Island (TMI)

The TMI Program is budgeted under the Converter Reactor Systems Program but is managed under the Office of Terminal Waste Disposal and Remedial Action. The objectives of this program are to acquire new information and conduct research and development that will substantially enhance nuclear powerplant safety, reliability, and operation; and to ensure the means for safe disposal of abnormal nuclear wastes resulting from an accident.

In consonance with the Administration's policy that responsibility for commercial nuclear power activities resides in the private sector, the Department's TMI Program is limited to research and development that will be of generic value to the development and safety of nuclear power and waste management. Responsibility for the costs of the TMI cleanup remain with General Public Utilities (GPU), the owner of the facility.

The TMI activities are being implemented in accordance with a Memorandum of Understanding among DOE, NRC, the Electric Power Research Institute (EPRI), and GPU. The efforts of GPU are aimed at plant cleanup and recovery. The Department has developed a program work scope that enables obtaining important research and development information that would not otherwise be available from the TMI cleanup effort. The DOE program is being conducted in a manner that avoids delaying the GPU cleanup schedule.

In accordance with a Memorandum of Understanding between DOE and NRC, the Department will acquire unique radioactive waste, including the damaged core, from TMI for research and development and for disposal. The cost of disposal will be reimbursed by GPU.

Two subprograms comprise the TMI Program: the TMI Waste Immobilization and Reactor Evaluation Program and the TMI Data Acquisition Program. The FY 1985 budget request for this program is $32.2 million, as compared with $37.0 million in FY 1984.

TMI Waste Immobilization and Reactor Evaluation. The objectives of this subprogram are: (1) to conduct research and development on immobilization of abnormal reactor waste products, and (2) to examine the TMI-2 reactor and core components *in situ* and to support development activities associated with the reactor defueling. The data and information acquired will provide an improved basis for evaluating licensing criteria and requirements, analyzing causes and consequences of accidents, and improving the reliability of the design and operation of light-water reactors. This subprogram was initiated in FY 1982.

The reactor evaluation activities include development associated with the examination, removal, and disposition of the reactor core and internals. This element also covers development of the special systems, equipment, facilities, and processes needed to accomplish the defueling operation, as well as performance of onsite examinations, tests, and evaluations required to handle the fuel effectively and expeditiously.

The development and engineering of systems, equipment, and procedures for removal and storage of the reactor plenum and for reactor defueling and fuel transfer will be continued in FY 1984. Removal of the reactor vessel head will be accomplished and core disassembly activities will be intensified, with the goal of removing the plenum in 1985 and starting the defueling in late 1986. The development work will be directed toward a thorough examination of the reactor internals and core. Substantial beneficial information and data on the condition of the reactor core and other internal components will be obtained. In addition, preparations will be completed to perform examinations of the fuel and debris and other reactor internal components to characterize the accident effects. The knowledge gained from this program will provide data required for evaluating present licensing criteria and requirements; developing future licensing criteria; and assessing and developing computer models used to analyze the course and consequences of severe accidents and means to mitigate the effects of such accidents; and evaluating improvements to reactor design, operation, and maintenance.

The waste immobilization activities were initially focused on an effort to demonstrate the feasibility of vitrifying zeolite ion-exchange materials. This effort was completed in FY 1983. Activities are now focusing on other techniques for the treatment of abnormal wastes produced at TMI. Long-term sample observation is being performed to provide a more extensive data base. The knowledge gained from this program will contribute substantially to the technology for processing and disposing of unique waste forms resulting from commercial nuclear powerplant abnormal operations and accidents.

TMI Data Acquisition Program. The objective of this subprogram is to obtain research and development data of generic value to the safety of light-water reactors. DOE and EPRI are sharing responsibility and costs for portions of this research and development program. Specifically, the Department is funding data gathering, research and development, and information transfer in the following major areas: instrumentation and electrical equipment survivability; behavior of radioactive products; data system and specimen archiving; and offsite fuel debris examination. EPRI has responsibility for research and development on mechanical and structural component reliability, pressure boundary recharacterization, and decontamination and dose reduction associated with the primary coolant system.

In FY 1985, DOE plans to complete the *in situ* and offsite examination of selected instrumentation and electrical components outside of the reactor vessel to ascertain their condition, cause of failure, and features that affect survivability. Data obtained will be used to upgrade qualification standards, regulatory guides, and operating and maintenance standards, in order to improve operation of nuclear plants and increase the likelihood of recovery from abnormal events. Efforts will continue on acquiring and analyzing solid, liquid, and gaseous samples to identify how various radioactive isotopes, which were released within the containment building during the accident, were transported and deposited. These data will be valuable in assessing the existing models for fission product release that are used in nuclear powerplant licensing. Efforts to prepare for the offsite fuel debris examination will be completed. The Technical Integration Office will continue its program management activities at the TMI site. The computer data bank system will continue to collect, store, and transfer the data and documentation generated by the DOE program during the GPU cleanup effort.

Uranium Enrichment Activities

The Department's funding request for the Uranium Enrichment Program in FY 1985 is approximately $1.7 billion in budget authority, which is fully offset by approximately $1.7 billion in projected revenue. The requested funds are distributed among the major elements of the program as indicated in the following table:

Major Program Element	FY 1984 ($ in Millions)	FY 1985
Uranium Enrichment Activities		
Power	$1,060.0	$ 883.3
Enrichment Research and Development	189.3	150.0
Gas Centrifuge Enrichment Plant	580.5	350.0
All Other	362.2	292.0
Total	2,192.0	1,675.3
Uranium Resource Assessment	1.8	0
Total Appropriation	2,193.8	1,675.3
Uranium Enrichment Revenues	-2,105.0	-1,675.3
Net Appropriation	$ 88.8	$ 0

Note: The FY 1984 numbers reflect comparabilities.

The budget for Uranium Enrichment Activities provides funding for three major program activities: (1) Power, (2) Enrichment Research and Development, and (3) Gas Centrifuge Enrichment Plant.

Power

The United States presently enriches uranium in three gaseous diffusion plants, located in Oak Ridge, Tennessee; Portsmouth, Ohio; and Paducah, Kentucky. In FY 1985, $883.3 million is requested to purchase power for operation of the gaseous diffusion complex. The three gaseous diffusion plants will operate at a power level of 2,790 megawatts in FY 1985 and will produce about 10.6 million SWUs. The FY 1985 power level is consistent with near-term sales of enrichment services.

In past years, DOE and its contractors have expressed concerns about operating the diffusion complex at low power levels. Experience gained with low power operating procedures during the past 3 years gives us confidence that the plants can be operated safely and reliably at 2,790 megawatts. Modifications to critical instruments have extended the measurement ranges to permit monitoring of low power operation. The use of block valve throttling has been successful in restoring controllability without detrimental wear to the block valves. Other modifications are also being implemented to further improve cascade control at low power levels. In conjunction with these changes, DOE is attempting to achieve the lowest possible power costs at all three GDPs.

Enrichment Research and Development

A major objective of the Uranium Enrichment Program is to retain our competitive edge in advanced technology. This will allow us to deploy lower-cost capacity when needed to meet customer demand, and thus regain our cost-competitive position. The FY 1985 budget request includes $150 million for enrichment research and development activities, including $72 million for gas centrifuge activities. The major portion of the funding is devoted to the Advanced Gas Centrifuge (AGC) Program for further development of the Set V centrifuge, which would provide economic and technical data in support of the FY 1985 technology decision to select either AGC or AVLIS for further development through the demonstration and deployment stage. The AGC Program goal is to develop a centrifuge with production output of up to three times the output of current-generation machines. This task is technologically challenging, but if it is successful, it can substantially enhance centrifuge plant economics.

The funding requested provides for the continuation of basic development tasks; continued operation of existing Set V test facilities; and development of materials and processes for improving centrifuge separative performance.

With the centrifuge funds appropriated in FY 1984, we are: (1) producing and testing Set V machines and key subassemblies; (2) initiating high-speed full-scale rotor testing for Set V concepts; (3) establishing baseline design criteria and preliminary designs of Set V centrifuge assemblies; and (4) qualifying vendors for Set V rotor materials. Results to date on AGC have been very encouraging, and we expect to begin testing full-scale Set V machines at high speed in late 1984.

The balance of the enrichment research and development funds -- $78 million -- is requested for the AVLIS Program. AVLIS is another research and development activity to develop low-cost methods of enriching uranium. This activity is proceeding at an aggressive pace and is producing significant analytical and test results.

FY 1985 funds are requested primarily to develop and operate laser and separator facilities for the two key portions of an AVLIS production facility, which will explore process performance parameters and validate process models. As with the Centrifuge Program, FY 1985 activities in the AVLIS Program will be directed toward supplying the economic and technical data in support of the FY 1985 technology sequencing decision.

Major accomplishments recently achieved in the program include the installation of the Materials Handling Demonstration Module (MHDM) at Oak Ridge; the demonstration of source vaporization efficiency and rate in excess of plant requirements; the achievement of enrichment runs at baseline liquid alloy conditions; the design and operation of high-power lasers; and the operation of the High-Power Laser Facility (HPLF) for long run times.

Gas Centrifuge Enrichment Plant

The FY 1985 budget request contains $310 million for the construction of GCEP and $40 million for GCEP startup and operations. This project provides additional enrichment capacity using the centrifuge technology, which has the potential of significantly reducing future enrichment costs. The FY 1985 budget includes funds for continued construction of Process Buildings No. 1 and No. 2 but does not include funds for initiation of Process Building No. 3, because of near-term reductions in demand for enrichment services and the potential for introduction of more advanced Set V centrifuge machines, currently under development, into the project.

The FY 1985 funding will provide primarily for engineering of the facility to accept the Set V machine, procurement (including centrifuge machines), and construction activities on Process Buildings No. 1 and No. 2, the Feed/Withdrawal Building, and the Recycle/Assembly Building. These activities have been reduced to the minimum level necessary to maintain a viable project while retaining the flexibility to make GCEP the most economical plant possible.

GCEP is making excellent progress. Process Buildings No. 1 and No. 2 are structurally complete and enclosed, with the process equipment being installed. In Process Building No. 1, installation of the service modules is nearly complete. The first centrifuge machine was installed in November 1983, approximately 2 months ahead of schedule. In early February 1984, 106 centrifuges were in place, and three had operated successfully at full speed with uranium hexafluoride gas for test purposes. Other major facilities, such as the Recycle/Assembly Building and the Feed/Withdrawal Building, are fully enclosed, and process piping and equipment are being installed. Many of the auxiliary buildings and utility systems have been completed and turned over to the operating contractor.

In FY 1984, we expect to: (1) continue routine manufacture of centrifuge assemblies; (2) install 540 Set III centrifuges in Process Building No. 1 and have 120 centrifuges operating with uranium hexafluoride gas; and (3) continue other construction activities at a rate to achieve operation of the first train of centrifuges (720 machines) in September 1985.

All Other

The FY 1985 budget request contains $288 million for gaseous diffusion operations and support, excluding power, and $4 million for program direction. The gaseous diffusion request includes funds for diffusion operations, process and long-range technical support, supporting services, and capital equipment and construction necessary to allow operation of the three gaseous diffusion plants in the most economical, reliable, safe, secure, and environmentally acceptable manner possible. The program direction request provides funds for 69 full-time equivalent positions, including personnel services, personnel benefits, travel, and contractual services and suppliers.

Mr. Chairman, this completes my formal statement. If there are any questions regarding our programs, I would be pleased to answer them at this time.

INTRODUCTION OF ASSOCIATES

Mr. BREWER. Thank you, Senator. I have a few summary remarks I would like to make.

Senator JOHNSTON. You might introduce those who are with you.

Mr. BREWER. I sure will. On my far left, John Longenecker, Deputy Assistant Secretary for Uranium Enrichment; Mike Lawrence, Director of the Waste Management Office on my left; Dr. Franklin Coffman, Director of the Remedial Action Program on my right; and Mr. Gordon Chipman on my far right, Director of Breeder Reactor Programs in the Department.

SUMMARY OF STATEMENT

Last year when we were up here, Senator, there were three major events on the agenda, the first being the submission of the licensing reform legislation, the second being the alternative funding plan in preparation for the Clinch River Breeder Reactor, and the third was the waste management legislation that had been passed in the 1982 lame duck session and the Department had mobilized for the implementation of the bill. Mr. Lawrence will be reporting on that directly.

The nuclear scene has changed enormously in the past year. As you know, there has been a recent wave of problem projects: Marble Hill, Sumner, Diablo Canyon, Byron, and there may be more. This wave of bad news underscores the need for licensing reform legislation that both the Department of Energy and NRC submitted last year.

We feel that the problem is not with the machine but with the institutions that regulate the technology and the whole infrastructure that constructs and finances and operates nuclear power, as well as regulates it.

We have also in the past 6 months, following the loss of Clinch River, restructured the breeder base technology program. About 1 year ago, we predicted a very severe market problem in the uranium enrichment program. That forecast has come true. We have lost a substantial market share to the secondary market, largely out of Europe. We have formulated and mobilized a strategy to respond to this problem. I will report to you in a moment on the progress in that regard.

LICENSING REFORM

If I could return to the first item, licensing reform, there are 48 nuclear plants in the pipeline awaiting operating licenses or under construction. We feel that each of these plants will suffer a very painful birth. We have found that utilities with operating plants are doing quite well financially and are delivering busbar costs less than or equal to national averages.

If you have, however, a plant under construction, then you have a problem. The first chart shows the total nuclear investment by the utilities in this country.

TOTAL INVESTMENT TO COMPLETE NUCLEAR-ELECTRIC PROGRAM

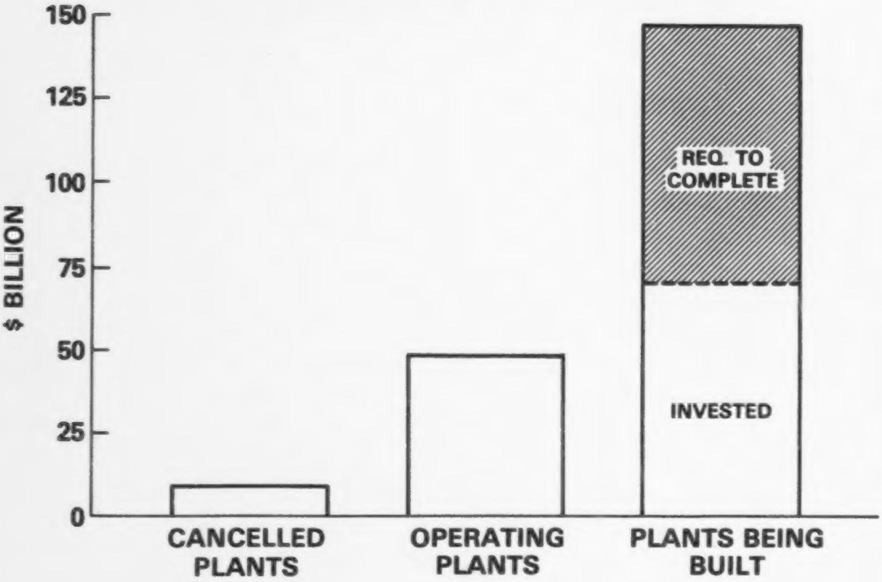


FIGURE 1

The total is $54 billion for those plants which are operating. That is the capital investment. And the plants that are in the pipeline total $147 billion, $70 billion of which has already been invested and $77 billion of which remains to be financed. So the total commitment to date to nuclear powerplants in this country is $201 billion. What is at risk presently, due to our chaotic and cumbersome licensing process, is the $147 billion for the plants which are in the pipeline.

NUCLEAR POWERPLANT LICENSING REFORM

Senator JOHNSTON. Are you going to send up legislation?

Mr. BREWER. Senator, we sent legislation up 1 year ago.

Senator JOHNSTON. You are not going to send up any new, additional legislation this year?

Mr. BREWER. It is not our plan to send any additional legislation up this spring. There is some movement in Senator Simpson's committee on the legislation, as there is some movement on the House side.

Senator HUDDLESTON. If I might ask a question, Mr. Chairman. Does the new legislation address the difficulties that you indicated a moment ago with certain plants that apparently were not fulfilling licensing requirements to begin with? Is it possible to make the licensing procedure less chaotic and less cumbersome but, at the same time, less likely to permit the kinds of problems we have seen there?

Mr. BREWER. It does exactly that, Senator. One of the features of the legislation is that it will focus the technical resources of NRC and the reactor industry on fewer, more standard products than has been the case in the past.

As you know, the 80 reactors we have operating are largely custom designed, custom constructed, and custom regulated. There has been very little trace memory or learning curve effect.

Senator JOHNSTON. It is the same sort of legislation you had in the last Congress, that allows you to bank sites, to license generic sort of——

Mr. BREWER. Yes, sir. There are five major features: Site banking, prelicensing of sites, licensing of standard designs, a more disciplined retrofit process. There are now 83 ways for the NRC to inflict retrofit requirements on plants without any sort of cost-benefit analysis or a tradeoff of any sort. One-stop licensing, which means you get all of your engineering and design done up front and you apply for a combined construction and operating permit, rather than this current process of design as you go.

Senator JOHNSTON. Then don't we have something on public hearings as well?

Mr. BREWER. Yes, sir. The fifth feature is a hybrid hearing process, which means that the first stage of hearings is of a legislative type, and if there are matters of genuine contested fact, then they are heard at an adjudicatory hearing.

Senator JOHNSTON. That is so you don't have to rehear those same old issues all over again.

Mr. BREWER. Yes, sir.

Senator JOHNSTON. Like whether nuclear power is cheaper or safer.

Mr. BREWER. Yes, sir. That is true.

Senator JOHNSTON. We don't need to get into that here, because this committee is not going to do that, so let's move along.

Mr. BREWER. I understand.

Senator JOHNSTON. In fairness, we asked you the questions about it.

URANIUM ENRICHMENT ACTIVITIES

Mr. BREWER. I would like to spend a moment, Senator, on the enrichment program.

As you know, since 1973 we have gone from being a monopoly supplier—we had 100 percent of the world market in 1973. Between 1973 and 1981, we lost about 65 percent of the world market. We went from 100 percent to 35 percent.

More recently, in the past 12 to 18 months, we have lost some U.S. domestic market.

There are two or three underlying causative factors for this recent loss of U.S. domestic utilities. First of all, the exchange rate between francs and the U.S. dollar has doubled. That is to say, 3 years ago you could get 4 francs for the dollar, now you can get 8. So $1 produces or buys twice as many units of enrichment service as it used to. Likewise with the other producer, URENCO.

The second factor that contributed to this erosion in the U.S. domestic market is the fact that all of the producers have been producing into a glut. There is a massive overinventory of separative work units (SWU's) which have been committed to in the past which are no longer needed because of reactor slippages or cancellations. Nevertheless, the utilities were required to accept the product because they had take-or-pay contracts. As a result, the secondary market could undersell any separative work unit produced either by United States or European producers.

The third major factor is that we had simply loaded too much cost into the SWU rate base. The program was trying to do too many things in parallel. We had simply not operated the enrichment enterprise as a business.

NEW ENRICHMENT CONTRACT

We have designed a recovery strategy which involves two major factors. First, we need to fix the market problem by stabilizing the U.S. share of the market. And the tool for doing this is the new contract which we recently issued on January 18, 1984. Let me describe the contract.

The contract is a requirements contract; it is not a fixed commitment contract. It is based on the customer's actual requirements, not on a commitment to take a certain number of SWU's each year for the next 30 years.

Therefore, we will no longer feed a secondary market. We will no longer produce into a glut.

The second major feature is the 30-percent offset allowance. We will allow the customer to obtain up to 30 percent of his requirements from sources other than the U.S. Department of Energy. This is designed to dry up the secondary market and allow our customers access to those cheaper separative work units so that we can get back to a normal, balanced supply-demand situation over the next 2 or 3 years.

The third major feature is a fixed price escalated only by known national indicators. We will set the price for a 10-year horizon and escalate it only by GNP inflators. We will not allow the program requirements to drive the price; we will require the market to drive the program.

GAS CENTRIFUGE ENRICHMENT PROJECT

Senator JOHNSTON. How does GCEP get into this?

Mr. BREWER. The gas centrifuge project at Portsmouth is on the production side, as are the three diffusion plants. Once we know with certainty what the U.S. share of the market is, we will design with detail the production plan for the next 10 years.

We have already decided to defer for the time being a decision to construct buildings 3 through 8 of GCEP. We have also decided to drop set IV technology centrifuge machines. We will go straight from set III, the current state of the art, to the advanced gas centrifuge machines, set V, if the technology decision in 1985 favors gas centrifuge. That leads me to the third strategic decision that we have made. That is, to not carry both advanced technologies on through the 1980's and incur those expenses and load those costs into the rate base. Rather, we will have an early decision, about 1 year from now, between advanced gas centrifuge and the laser process, AVLIS.

The response to the new contract has been very robust and very vigorous. Three or four weeks ago the first contract was signed, and it was for almost $2.5 billion with Duke Power. We have oral commitments, or letters of intent, from over 50 percent of our enrichment customers, and we have only been marketing for about 1½ months.

The contract conversion period will close on October 1, 1984. At that time, once we have a stable floor for our U.S. market, we will define the production strategy in more detail.

WORLD ENRICHMENT MARKET

Senator JOHNSTON. Dr. Brewer, what do you consider to be the total market over the next 10 years, not the U.S. share of that, but the total enrichment market?

Mr. BREWER. Mr. Longenecker, do you have an estimate?

Mr. LONGENECKER. In total sales or our share of the market?

Senator JOHNSTON. No, total sales, worldwide.

Mr. LONGENECKER. We expect the total sales worldwide in the next decade to be on the order of 35 million separative work units per year. We have the capacity at this time to produce 27 million separative work units per year.

Mr. BREWER. Senator, that is another point that should be borne in mind. The world demand level at this time is something like 20 to 25 million SWU's per year. The world now has a capacity of 42 million SWU's per year. So we have not only a large number of SWU's out there which are not needed, that have already been produced or have been committed to, but we are over capacity by about a factor of two.

Senator HUDDLESTON. A factor of how much?

Mr. BREWER. About a factor of two. There are about 42 million SWU's per year in world capacity between the United States, URENCO, EURODIF, and the U.S.S.R. Only about half of that is needed today on an annual basis. Currently, the secondary market, the overage, the excess inventory, is between 30 and 40 million SWU's. So there are a couple of years of world production that could be taken from the secondary market.

Gas Centrifuge Enrichment Plant

Senator Johnston. As I understand your answer on GCEP, it was that you were going to evaluate the world market and our share thereof, and upon making that evaluation, then you would decide what to do on sets III and IV.

Mr. Brewer. Yes, sir.

Senator Johnston. Whether to have them and what kind of technology. And in the meantime, you essentially slowed the program down to zero.

Now, it seems to me that the decision has sort of been made based upon your last answer. That is, if we are overproducing by a factor of two, it doesn't look like the judgment is that you need sets III and IV.

Mr. Brewer. Quite the contrary, Senator. We have stretched out the machine procurement for buildings 1 and 2, which have already essentially been completed, at Portsmouth. We have deferred the decision to construct buildings 3 through 8 until the market tells us what it needs.

Senator Johnston. What I am getting at is, you are not anticipating a market signal that says full speed ahead any time soon, are you?

FUTURE ELECTRICAL DEMAND

Mr. Brewer. Well, if the electrical demand growth returns, as it has, to 3.2 percent, or thereabouts, one has to double the total capacity in about 25 years. That is another 500 gigawatts of new capacity needed for this country. If you assume that half of that is nuclear and half is coal, then you are looking at a wave of new orders sometime in the latter part of this decade or in the 1990's of over 200 gigawatts.

So if you believe nuclear power will return, if you believe nuclear power must return, then there will be demand for added capacity.

The other reason, of course, to go to gas centrifuge or to laser isotope separation is to put ourselves in a commanding competitive position with respect to the other producers once the market transience has been resolved.

Senator Johnston. Did you want to talk about your other technologies?

Mr. Brewer. I think at this time, Mr. Chairman, I will take questions.

GASEOUS DIFFUSION PLANTS

Senator Huddleston. It might be good if I could insert here a couple questions about the gaseous diffusion plants, because we have particular interest in that in Kentucky.The plant in Paducah is acknowledged as the workhorse of the uranium enrichment program, the most efficient, highest capacity plant of the three gaseous diffusion plants we have. It is critical to our State and the western Kentucky area particularly, with the jobs involved there and the millions of dollars of annual income that are tied directly to the future of that plant.

We have been in touch with Secretary Hodel about this on several occasions. Staff has met with Mr. Longenecker. I appreciate the Department's cooperation in keeping us advised of your activities and the new developments in this area.

But I want to take this opportunity to emphasize again my desire to continue to be kept fully advised and to urge again that no steps be taken regarding the future of the Paducah plant without full, prior consultation with our State's congressional delegation. I hope that we have your assurances on that.

Mr. BREWER. You have our assurances, Senator.

U.S. ENRICHMENT STRATEGY

Senator HUDDLESTON. Your 1982 operational plan indicated the feasibility of terminating the operation of one of these existing gaseous diffusion plants in the early 1990's. A diffusion plant shutdown study was initiated to identify which one would be shut down, based on the impact upon the economics of the uranium enrichment enterprise.

In view of the Department's revised enrichment strategy, what is the status of that study at the present time?

Mr. BREWER. Mr. Longenecker?

Mr. LONGENECKER. Senator Huddleston, in 1983 we did begin a preliminary evaluation of the key factors needed to be assessed in determining whether and when one of the GDP's could be shut down. That study was taken to the point of evaluating several key factors: Plant deficiencies, plant age, unique operating flexibility of each plant as part of the entire complex, and the symbiotic operating effects between the plants. Obviously, each plant has unique capabilities in producing the ultimate product for civilian and military use.

Our study was taken to the point of collecting enough data to assess each of the key technical factors. We then folded those results into the ongoing uranium enrichment enterprise strategy study and concluded that with the instability caused by the existing secondary market, the key driving force of customer demand would only be determined by the new contract. Thus, we could not assess the first criterion in the shutdown study, our ability to meet customer demand in the long term.

Now, to elaborate just a bit on that point, we expect to produce and sell about 10 to 11 million SWU's to civilian customers in the next fiscal year. One year ago, in the same operating plan which mentioned the shutdown study, we projected sales of about 15 million SWU's in fiscal year 1985. The secondary market is clearly significant. It will take 3 to 7 years for the market to stabilize. At that time we see supply and demand coming into balance. And by the year 1990 or 1991, we may see a demand for U.S.-enriched uranium that may exceed the capacity of two gaseous diffusion plants.

Given this uncertainty in demand we could not proceed with a study and come to a conclusion on when one of the plants could be shut down. So clearly we could not proceed to the final step of which of the plants to shut down. With the market response to the contract by October, we will be able then to assess what our demand is over the next decade. We can then develop a new operating plan in early 1985 and determine whether we can shut down a GDP and, if so, which one and in what timeframe.

Senator HUDDLESTON. So there have not been preliminary recommendations at this point as to whether or which plant might be closed?

Mr. LONGENECKER. No, sir.

Senator HUDDLESTON. And the period for contract conversion closes at the end of September of this year?

Mr. LONGENECKER. October 1.

Senator HUDDLESTON. What is the timetable then after that for analyzing the data and developing the new strategy?

Mr. BREWER. It would be done in concert with our fiscal year 1986 submission, which would be January 1985. The President's budget would come over to Congress in January 1985.

Senator HUDDLESTON. Then is it pretty safe to say that you don't anticipate any major decisions relative to the GDP's until that time?

Mr. BREWER. That is correct, Senator.

Senator HUDDLESTON. Thank you. Thank you, Mr. Chairman.

Senator JOHNSTON. Did you have something further, Dr. Brewer?

Mr. BREWER. Mr. Chairman, I am finished with my formal presentation. I am here with my staff to answer your questions.

NUCLEAR WASTE MANAGEMENT PROGRAM

STATEMENT OF MICHAEL J. LAWRENCE, ACTING DIRECTOR, OFFICE OF CIVILIAN WASTE MANAGEMENT

Senator JOHNSTON. Why don't we go ahead and hear from Mr. Lawrence first on waste management. Then we will come back to questions.

PREPARED STATEMENT AND BIOGRAPHICAL SKETCH

Mr. LAWRENCE. Thank you, Senator. I have a statement which I submitted for the record and would like to simply summarize the status of the program during the past year since the act was passed and what some of the future milestones look like.

[The statement and biographical sketch follow:]

STATEMENT OF MICHAEL J. LAWRENCE

Mr. Chairman and Members of the Subcommittee:

I am pleased to appear before you today to discuss the Department of Energy's (DOE's) Fiscal Year 1985 commercial nuclear waste management and spent fuel storage budgets and programs. The FY 1985 budget represents the first budget formulated by the Office of Civilian Radioactive Waste Management, recently established under the Nuclear Waste Policy Act of 1982.

The FY 1985 budget presents an integrated picture of programmatic activities including: repository deployment, monitored retrievable storage development and fund management which are specifically financed by fees collected from utilities and placed into the Nuclear Waste Fund; and, research and development activities not eligible for financing under the Nuclear Waste Fund, including research and cooperative agreements on spent fuel and research on alternative disposal concepts. These latter activities are funded under Energy Supply Research and Development in a program entitled Civilian Radioactive Waste Research and Development (R&D).

The FY 1985 budget request for obligational authority funded by the Nuclear Waste Fund is $327.669 million.1/ This budget request is summarized in Table 1. The FY 1985 Departmental budget request for Energy Supply R&D, which covers activities not eligible for funding under the Nuclear Waste Fund, is $27.64 million. This budget is summarized in Table 2.

The $327.669 million requested will be used to fund the activities under the direction of the Office of Civilian Radioactive Waste Management. These activities are fashioned on the fundamental objective of the Nuclear Waste Policy Act of 1982 (NWPA), which is:

1/ The NWPA requires the Secretary to submit a triennial budget for the Nuclear Waste Fund. The discussion of specific activities presented in the Waste Fund Program gives estimates for FY 1986 and FY 1987. The estimates for the total Waste Fund Program are: FY 1986 - $525.4 million; FY 1987 - $528.6 million.

"to accept high-level radioactive waste for safe management, storage and permanent disposal on a firm schedule, beginning not later than January 31, 1998."

By achieving this fundamental objective and implementing an appropriate waste acceptance schedule, this will initially preclude the need for additional at-reactor storage by nuclear utilities after January 31, 1998, and, ultimately, remove all eligible waste from at-reactor storage.

TABLE 1

FY 1985 CONGRESSIONAL BUDGET
NUCLEAR WASTE FUND
(Budget Authority In Thousands)

	FY 1983 Approp.	FY 1984 Approp.	FY 1985 Request
NUCLEAR WASTE FUND			
Repository Deployment			
o First Repository	$192,537	$246,560	$247,100
o Second Repository	12,322	16,270	28,700
Monitored Retrievable Storage	3,499	12,000	8,500
Program Management and Technical Support	7,175a/	40,091b/	40,069
Debt Service (Interest)	3,057	4,700	3,300
TOTAL	$218,600a/	$319,621b/	$327,669
Projected Receipts	(73,600)	(310,600)	(377,800)
Staffing FTE's	110	204	236

a/ Includes comparability adjustments of $1,275,000 for FTE's reassigned for other Departmental activities.

b/ Includes comparability adjustments of $946,000 for FTE's reassigned from other Departmental activities.

TABLE 2

FY 1985 CONGRESSIONAL BUDGET
ENERGY SUPPLY RESEARCH AND DEVELOPMENT ACTIVITIES
(Budget Authority In Thousands)

	FY 1983 Approp.	FY 1984 Approp.	FY 1985 Request
Civilian Radioactive Waste R&D			
Spent Fuel Storage R&D	6,389	5,000	13,200
Alternative Disposal Concepts	6,000	4,700b/	12,000
Generic Methods and Supporting Studies	17,875a/	1,600	2,174
Program Direction	130	130	266
TOTAL	$30,394	$11,430	$27,640

a/ Reflects adjustment of $125,000 transferred, to the Office of Energy Research for Small Business Innovative Research efforts in accordance with P.L. 97-219.

b/ Excludes $2,800,000 reprogramming from other DOE accounts accordance with Congressional directive in the Conference Report, H. Report 98-272, to P.L. 98-50.

Before discussing the details of the FY 1985 budget request, I would like to briefly give an overview of what we have accomplished since enactment of the Nuclear Waste Policy Act of 1982 and the mandated milestones that we have not met; the organization alignment for carrying out the responsibilities of Civilian Radioactive Waste Management; and the basic program strategy.

OVERVIEW

Accomplishments Since Enactment of the NWPA

Much has been accomplished in the 13 months since enactment of the NWPA on January 7, 1983. However, this also has been a period of organizing, reorienting and redirecting the Federal Government's nuclear waste management efforts under the new law.

The NWPA sets forth an unusually precise and complex schedule of tasks that must be accomplished and a set of procedures that must be followed. During the past 13 months, the NWPA required that the following major demanding tasks be accomplished:

- Within 90 days of enactment, identify states with one or more potentially acceptable repository sites and notify the Governors, the state legislatures, and the Tribal Councils of any affected Indian tribes in such states;

- Within 90 days of enactment, publish a joint Department of Energy/Nuclear Regulatory Commission (DOE/NRC) notice in the Federal Register that the United States is prepared to cooperate with and assist non-nuclear weapon states in at-reactor and away-from-reactor fuel storage, monitored retrievable spent fuel storage, geologic disposal of spent fuel, and the health, safety, and environmental regulation of such activities;

- Not later than 90 days after enactment, establish a one-time fee per kilogram of heavy metal in spent nuclear fuel or in solidified high-level radioactive waste existing prior to April 7, 1983;

- Not later than 180 days after enactment, establish fee collection and payment procedures;

- By June 30, 1983, enter into contracts with all owners and generators of spent nuclear fuel or high-level radioactive waste;

- Within 180 days of enactment, establish payment charges for Federal Interim Storage Services;

- Not later than 180 days after enactment, issue general guidelines for recommending repository sites;

(Not met. Expect to issue late spring, early summer-1984)

- Not later than six months after enactment, submit to Congress a report describing the essential research and development needed to develop a proposal for a monitored retrievable storage facility;

- Not later than one year after enactment, select at least 1, but not more than 3, civilian nuclear power reactor sites to conduct a demonstration program, in cooperation with the private sector, for the dry storage of spent nuclear fuel;

- Within one year of enactment, submit a report to Congress with respect to alternative approaches to managing the construction and operation of all civilian radioactive waste management facilities, including the feasibility of establishing a private corporation;

(Not met. Advisory Panel established 12/83; report to secy. 10/84; report to Congress 12/84.

Annually prepare and submit to Congress a report on any plans for providing interim storage capacity;

- Submit an annual report to Congress on the activities and expenditures of the Office of Civilian Radioactive Waste Management;

(Expect to submit by mid-March 1984.)

- Not later than one year after enactment, transmit to Congress a report setting forth whether the Secretary plans to colocate a test and evaluation facility (TEF), if built, with a repository.

Of these 13 tasks, 10 have been completed on or before schedule. One, the TEF report, will be several weeks late and only two have not been met:

(1) issuing general repository siting guidelines; and, (2) submitting a report to Congress on alternative approaches to managing the construction and operation of all civilian radioactive waste management facilities. The status of these two tasks is as follows:

(1) Siting Guidelines

As previously stated, the NWPA requires that DOE issue general guidelines for recommending repository sites within 180 days of enactment, and that these guidelines be developed in consultation with the Council on Environmental Quality, the U.S. Environmental Protection Agency, the U.S. Geological Survey and interested Governors. In addition, these siting guidelines are to be concurred in by the NRC. We have not as yet issued final guidelines.

In February 1983, DOE published draft guidelines. Public Hearings were held and written and oral comments were received. DOE met with representatives from affected and interested states to discuss the guidelines and to answer questions. More than 2,000 individual comments were received. An alternative guidelines document was issued to incorporate many of the comments and suggestions received. A second public comment period was provided. Due to this expanded consultation process, the 180-day deadline for issuing final guidelines passed.

After the close of the second comment period, which resulted in 900 additional comments, draft final guidelines were prepared and provided to the states. Following a plenary state consultation meeting and further revisions, the states were also given copies of a final internal review draft and invited to comment on important remaining issues. Final guidelines were subsequently forwarded to NRC for review and concurrence on November 22, 1983. NRC held a hearing on the guidelines January 11, 1984. Upon receipt of concurrence by NRC, DOE will issue final siting guidelines.

It is DOE's belief that the importance of full consultation with states and the need for public comment on the general guidelines to be used for recommending repository sites has warranted the delay in issuance.

(2) Report to Congress on Alternative Approaches to Managing

The NWPA requires the Secretary to undertake a study with respect to alternative approaches to managing the construction and operation of all civilian radioactive waste management facilities, including the feasibility of establishing a private corporation.

On December 16, 1983, the Secretary appointed an advisory panel to undertake this study. The panel is made up of thirteen representatives of State governments, Indian Tribes, private industry and the general public and has been charged with studying alternative means of financing as well as managing the problem. The panel's recommendations to the Secretary are expected to be completed by October 15, 1984 and the report will be submitted to Congress on or about December 31, 1984.

The organization within DOE which has been carrying out the waste management responsibilities since enactment of the NWPA is described below.

Organization

The NWPA called for the establishment of the Office of Civilian Radioactive Waste Management to be headed by a Director appointed by the President, by and with the advice and consent of the Senate. It is my understanding that the Secretary has recommended to the White House a candidate for Director.

Shortly after passage of the Act, however, the Secretary established a temporary project office to carry out the near-term requirements of the Act until the formal office could be activated. In October 1983, the Secretary formally approved and activated the permanent Office of Civilian Radioactive Waste Management (OCRWM).

The permanent organization has been divided into four major functional components. These four functional components closely align with those laid out in the Act. They are:

- o Geologic repository activities;
- o Storage and systems development activities;
- o Management and management support functions; and
- o Overall program direction and institutional relations.

The primary function of the Office of Geologic Repository Deployment is to site, design, construct, operate, and decommission the radioactive waste disposal facilities. It is also responsible for screening and characterizing potential geologic repository sites; recommending sites; conducting field tests including in-situ tests via exploratory shafts; developing waste emplacement packages; preparing documents to meet all regulatory, licensing, safety, environmental and quality assurance requirements; cooperating with State and Indian tribes; evaluating the need for and designing a test and evaluation facility; and managing the research and development of disposal technology for both repositories and alternative means of permanent disposal.

The Office of Storage and Systems Development manages the activities related to interim storage and any associated R&D efforts; monitored retrievable storage; waste packaging and handling; and transportation systems.

The Office of Management administers the Nuclear Waste Fund, the Civilian Radioactive Waste R&D Program, and, if activated, the Interim Storage Fund. It is also responsible for overall planning; budget preparation; financial management, management information, including personnel; and, data systems.

The Institutional Relations Staff has primary responsibility for developing and coordinating OCRWM's institutional and external relations.

Attachment 1 depicts the overall Headquarters organization structure and major responsibilities. Attachment 2 depicts the functional alignment.

Program Strategy

DOE is required to prepare a comprehensive Mission Plan to serve as a means of both planning the program and demonstrating its conformance to the requirements of the NWPA.

The Mission Plan will consist of two volumes. Volume I will be the plan for conducting the civilian radioactive waste management program, including discussion of the program's policy, strategy, plans and intended schedule. Volume II will include more detailed information to address the items specifically required by the Act, including an identification of the primary scientific, engineering and technical information; an evaluation of financial, political, legal or institutional problems that may impede implementation of the Act and plans to resolve such problems; and identification of the possible adverse economic and other impacts to the State or Indian tribe involved that may arise, from the development of a repository at a site.

An advanced copy of Volume I of the draft Mission Plan was sent in late December 1983 to the Nuclear Regulatory Commission and other Federal agencies, the Congress, State governments, affected Indian tribes, utilities and nuclear industries.

Volume II is currently being prepared. When completed, and as required by the Act, both Volumes of the draft Mission Plan will be released to interested parties, as well as to the general public, for review and comment by April 7, 1984.

When finalized in mid-1984, the Mission Plan will be submitted to Congress.

As set forth in the draft Mission Plan, DOE will pursue four major program goals:

1. Site, design, construct and operate the first mined geologic repository by January 31, 1998.

2. Design an engineered Monitored Retrievable Storage facility, on a schedule that will permit its timely construction, if authorized by Congress.

3. Assist utilities in providing adequate, safe at-reactor storage of spent fuel and stand ready to provide limited Federal Government storage to utilities if they are determined qualified by the Nuclear Regulatory Commission.

4. Manage the technical program and the funds collected for disposal and storage services, in an effective and efficient manner.

DOE plans to carry out this program with full adherence to the legislated institutional process, while developing sound technical data needed to support key milestones and decision points.

To accept high-level radioactive wastes for safe management, storage and permanent disposal beginning not later than January 31, 1998, a demanding set of technical, regulatory and institutional challenges will have to be met. With these challenges in mind, we have formulated the FY 1985 budget request that we are presenting to you today.

I would like to highlight some of the major elements of the FY 1985 program. The discussion is divided into two parts which coincides with the two separate budgets managed by the Office of Civilian Radioactive Waste Management: The Nuclear Waste Fund Program; and the Civilian Radioactive Waste Research and Development Program.

THE NUCLEAR WASTE FUND PROGRAM

Revenue Sources

The NWPA established the Nuclear Waste Fund to finance the waste disposal program. The Fund receives all the revenue the DOE collects from the nuclear utilities under the disposal services contract.

The main source of revenue for the Fund is the one mill per kilowatt hour fee charged for all electricity generated by civilian nuclear reactors beginning April 7, 1983. The NWPA provides for annual review and adjustment to assure that the fee is sufficient to recover all program costs.

A preliminary review and evaluation of this fee was undertaken during FY 1983 to determine if the one mill fee is sufficient to meet the full cost recovery mandate. The resulting report published in June 1983, estimates total system life cycle costs at nearly $20 billion in constant 1982 dollars.

Additional work on the fee adequacy was initiated in July 1983 to prepare for the next annual review to be published in July 1984. Based on the latest forecasts of the Energy Information Administration, revenue projections are declining. The near-term impact of the lower revenues could constrain the program. Therefore, the revenue projections contained in our FY 1985 budget now assume the 1 mill per kilowatt hour fee will be escalated to the rate of 4.7 percent in FY 1985 and 4.5 percent in FY 1987. DOE is still evaluating these estimates and will make its final recommendation in July 1984 when the annual Fee Adequacy Report is due to Congress.

Assuming that the 1 mill per kilowatt hour fee is escalated as described above, revenue projections are as follows:

NUCLEAR WASTE FUND REVENUE PROJECTIONS
(In Thousands)

FY 1983	FY 1984	FY 1985	FY 1986	FY 1987
$73,600	$310,600	$377,800	$435,000	$504,300

High-level radioactive waste and spent fuel generated prior to April 7, 1983, is subject to a one-time fee per kilogram of heavy metal in such spent fuel or high-level waste. The fee must be equivalent to an average charge of one mill per kilowatt hour. The utilities have three options for paying this fee and must decide by June 1985 on the option they select. Until then, it is not possible to predict when these revenues will be available to the Fund. However, the one-time fee is estimated to be $2.3 billion now and will increase as interest is applied to the fee if the utilities choose to defer payment.

The Nuclear Waste Policy Act also requires the Department to evaluate the use of disposal capacity at one or more repositories for the disposal of high-level radioactive waste resulting from atomic energy defense activities. This study which is funded from the Defense appropriation is due to be completed in January 1985. If the Department decides to recommend disposal of the defense waste in a commercial repository, the Federal Government would pay for disposal of that waste in the repository.

Program activities funded by the Nuclear Waste Fund include: the geologic repository deployment programs; monitored retrievable storage; transportation; and program management and technical support. I would now like to highlight some of the major elements in those areas and in the FY 1985 budget request.

Repository Program

A. First Repository

The draft Mission Plan highlights a repository program divided into three phases. Phase 1 is Site Screening, Phase 2 is Site Characterization, and Phase 3 is Site Licensing and Construction. The current schedule for achieving major milestones within these three phases and associated with the first repository is as follows:

Phase 1

o Identification and Notification of Potentially Acceptable Sites (nine)	February 1983
o Issuance of Final Siting Guidelines	June 1984
o Issue Draft Environmental Assessments	Summer 1984
o Issue Final Environmental Assessments on five or more sites to be nominated	Fall 1984
o Nominate five or more sites as Suitable for Site Characterization and Recommend 3 Sites for Site Characterization	By January 1, 1985

Phase 2

o President Approve Sites for Characterization	March 1985
o Issue Site Characterization Plans for 3 Sites	March 1985
o Begin Exploratory Shaft Construction	March 1985
o Recommend First Repository to President	December 1990

Phase 3

o President Recommend Site to Congress	February 1991
o Submit Construction Application to NRC	February 1991
Receive Limited work Authorization	August 1991
Receive full authorization	February 1994
o Begin Repository Operation	January 1998

The FY 1985 budget request for activities associated with the first repository is $247.1 million. The FY 1986 estimated is $427.1 million; and the FY 1987 estimated is $403.2 million.

The FY 1985 activities included in the $247.1 million are as follows:

- Recommend three sites for site characterization for the first repository and begin detailed geologic, environmental and socio-economic studies and evaluations of those sites. Activities would include drilling and coring operations to better understand site stratigraphy and tectonics; comprehensive evaluation of site and regional geohydrology; other geotechnical analyses, such as seismicity, geochemistry and volcanism. ($58.2 million)
- Begin construction of and preparation for exploratory shafts at up to two of the three candidate sites and begin planning for performance of in-situ tests. ($56.2 million)
- Conduct site-specific engineering studies at the three recommended candidate sites consisting of evaluations of rock mechanics, shaft and tunnel excavation methods, equipment development, waste emplacement alternative methods and repository design studies. ($37.4 million)

- Conduct other engineering studies and analyses to determine the behavior of materials being considered for waste packages, develop test facilities for testing the performance of component materials and designs, and develop models and computer codes to ensure the engineered systems and the site will perform individually as well as collectively for overall repository performance. These studies will assist in the development of the necessary planning and licensing documents required by the NWPA and the Nuclear Regulatory Commission. ($85.7 million)

- Continue Federal/State assistance to States and Indian tribes so that they can participate in the repository plans and activities. These funds are provided to allow States and Indian tribes to study, determine, comment on and make recommendations on possible health, safety, environmental, social and economic impacts of a repository. ($9.6 million)

The FY 1986 and FY 1987 estimates of $427.1 million and $403.2 million, respectively, will support concurrent full site characterization efforts at all three recommended repository sites, shaft procurement and construction at those sites and enhanced site-specific waste package and repository engineering and design efforts.

B. Second Repository

Although construction of a second repository has not been authorized, the NWPA sets forth a schedule for siting a second repository. The activities for siting and designing a second repository include the same processes as for the first repository. The second repository program is being conducted so that the four-and-a-half year lag time between the recommendation of sites for site characterization for the first repository and the recommendation of sites for site characterization for the second repository will be preserved to the maximum extent possible.

The siting process for the second repository is presently in the regional characterizaion phase in which DOE is conducting studies in 17 states in media such as crystalline rock in the North Central, the Northeastern and the Southeastern parts of the United States.

The current schedule for achieving major milestones within the second repository program is as follows:

Phase 1

o Identification and Notification of Potentially Acceptable Sites	Summer 1985
o Issue Draft Environmental Assessments	Fall 1988
o Issue Final Environmental Assessments	Spring 1989
o Nominate and Recommend Sites for Site Characterization	Fall 1989

Phase 2

o President Approve Sites for Characterization	Fall 1989

Phase 3

o President Recommend Site to Congress	Summer/Fall 1995

The FY 1985 budget request for activities associated with the second repository is $28.7 million. The FY 1986 estimate is $50.6 million; and the FY 1987 estimate is $75.6 million.

The FY 1985 activities included in the $28.7 million are as follows:

- Continue development of a data base for studies in crystalline rock formation.
- Complete and issue draft crystalline rock area recommendation reports.
- Complete and issue draft crystalline rock area characterization plan.
- Identify potentially acceptable sites and notify States.

- Review of existing repository conceptual designs from the salt, basalt and tuff programs, along with review of repository designs for crystalline rock from the Swedish, Canadian and Swiss programs.

- Continue tests at th Stripa mine in Sweden and the Colorado School of Mines.

- Initiate testing at the Canadian Underground Research Laboratory and prepare plans and instrumentation for testing in the Climax facility in Nevada.

- Continue Federal/State assistance.

The FY 1986 and FY 1987 estimates of $50.6 million and $75.6 million, respectively, will support field investigations, including drilling of one or more boreholes, which will be completed in summer 1987.

To supplement repository site characterization and to resolve repository engineering and licensing issues identified through the licensing application review process, the NWPA authorizes DOE to build a Test and Evaluation Facility (TEF). The following is a discussion of the status of DOE's activities regarding a TEF.

Test and Evaluation Facility

DOE has evaluated the role and location of a TEF with respect to its potential benefits to the repository program. At this time, DOE believes that the acquisition of additional site specific information, if needed in the repository program, can best be achieved by developing a collocated TEF. Our current plans are to make a decision in late 1987 on the need for a collocated TEF. No funds are requested in FY 1985.

At this time, it is uncertain what role the additional site specific data will play in the program and their degree of importance, relative to the data acquired during the site characterization phase. To a large extent, this uncertainty will diminish as the site characterization plans for the three candidate repository sites are prepared and submitted, reviewed by the NRC, and updated as more is learned about the sites and feedback from the NRC is incorporated into the program. By late 1987, according to the current repository schedule, five updates to the initial site characterization plans will have been prepared and issued, and initial test planning to aid in determining data needs will be well along. At that time, DOE will be in a better position to decide on the need for a collocated TEF.

I would like now to discuss our plans regarding the study of the need for and feasibility of an MRS.

Monitored Retrievable Storage

The near-term objective of the MRS program is to prepare and submit a proposal to Congress on or before June 1, 1985, for the construction of one or more MRS facilities. The FY 1985 budget request to support the MRS program is $8.5 million. The FY 1986 and FY 1987 estimates of $1.5 million, assume maintaining the MRS option without proceeding toward deployment.

In FY 1983, DOE prepared a report to Congress describing the research and development activities necessary to develop a MRS proposal. This report concluded that "no further research and development activities are considered necessary to develop a MRS proposal as required by the Nuclear Waste Policy Act of 1982."

The proposal due to Congress June 1, 1985, will be based on a detailed study of the need for and feasibility for one or more MRS facilities. The study will include detailed designs, specification, and cost estimates in sufficient detail to support Congressional consideration for authorization of such facilities.

In October 1983, an Architect/Engineer was competitively selected to do the designs and plans necessary for the proposal. In the development of the MRS proposal, prime consideration will be given to safety and flexibility of the design concepts. The selected concepts have inherent safety features and are considered among the safest concepts considered. Since actual deployment of an MRS is dependent upon congressional authorization which will include, among other factors, the status and timing of the geologic repository program, flexibility is a key consideration in the MRS concept selection. The sealed storage cask and the open field drywell concept were selected. Both concepts are modular, capable of being designed and built with a small initial capacity but expanded as necessary with a minimum of lead time and cost penalty. Both concepts can also readily accommodate either spent fuel or solidified high level waste. These two design concepts will be developed as potential concepts for three potential sites.

In FY 1985, the design efforts will be completed, culminating in the presentation of the Proposal to the Congress. In addition, in FY 1985, a siting plan to be included in the proposal will be completed based on criteria and siting approach developed in FY 1984. Also, as required, an Environmental Assessment document will be completed and submitted to Congress with the MRS proposal along with a plan for integrating the MRS with the other authorized storage and disposal facilities.

The FY 1986 and FY 1987 estimates of $1.5 million each year will provide for proposal follow-up and updating of designs to respond to technology or requirements changes. Should the Congress decide to proceed with authorization of an MRS, activities in FY 1986 and beyond would include preparation of an Environmental Impact Statement, selection of an Architect/Engineer and Construction Management team, initiation of Title II design, site related activities, etc. However, additional funding would be required in FY 1986 and in FY 1987.

Program management and technical support is required to support the management of the Nuclear Waste Fund, the repository program and monitored retrievable storage programs as well as to integrate these programs. I would like now to briefly describe those requirements for FY 1985.

Program Management and Technical Support

The FY 1985 budget request for program management and technical support is $40.069 million. The FY 1986 estimate is $41.0 million and the FY 1987 estimate is $41.3 million.

The FY 1985 funding level of $40.069 million will support the following activities:

- Continue technical contractor support for conducting safety and design reviews; coordinating and developing licensing documentation; technical assistance support in program analysis and system engineering, cost trade-off studies, reviewing site characterization plans, reviewing environmental assessments; and reviewing design of shafts, surface facilities, and underground excavation for a repository and assisting DOE in coordinating the overall civilian radioactive waste management program. ($9.6 million)

- o Develop standard material test methods; analyze repository transporation needs; and maintain inventory of spent fuel for future test programs and calculate fees. These activities include maintenance of the Engineer Maintenance Assembly and Disassembly (E-MAD) facility; development of standard materials characterization methods by the Material Characterization Center (MCC); transporation studies and systems integration analysis for the disposal program; and other supporting studies including fund management activities. ($14 million)

- o Provide for a total of 236 Federal full-time equivalents (FTE's) for positions in the field and at Headquarters to manage funding, site investigation, technology development and institutional liaison required to obtain State, NRC and Presidential decisions for repository siting, MRS and supporting programs. ($16.469 million)

The FY 1986 and FY 1987 estimates of $41.0 million and $41.3 million, respectively, will provide for increased and continuing technical support in reviewing and updating the site characterization plans and for additional manpower to review site selection documents.

Debt Service

Debt Service in the budget request identifies the estimated interest expenses that the Nuclear Waste Fund will accrue. When the Nuclear Waste Fund was established in FY 1983, the NWPA required the Department to transfer all unexpended balances to the Fund which were previously appropriated under the Energy Supply Research and Development account for Fund activities. This transfer totaled $254 million. These funds are to be repaid with interest to the General Funds of the Treasury.

The FY 1985 Debt Service (Interest) requirements are $3.3 million. The FY 1986 estimates are $5.2 million; and the FY 1987 estimates are $7 million.

The Waste Fund is allowed to earn interest on funds in excess of outstanding Treasury debt. The current and expenditure projection indicate that liquidation of the debt will not occur prior to FY 1989. However, if the Department receives the lump sum payments of approximately $2.3 billion for spent fuel discharged prior to April 7, 1983, the Department might ask for supplemental budget authority to liquidate the debt sooner. Because the nuclear utilities have three payment options, two of which defer payments with interest, DOE cannot anticipate what monies will be received until the date upon which they must select the option, June 1985.

This concludes my discussion of the activities under the Nuclear Waste Fund Program; I would like to now to discuss the Civilian Radioactive Waste R&D Program which is comprised of generic research and cooperative agreement activities consistent with the NWPA but not eligible for funding through the Nuclear Waste Fund.

CIVILIAN RADIOACTIVE WASTE RESEARCH AND DEVELOPMENT PROGRAM

The NWPA requires the Secretary to budget for spent fuel storage R&D; alternative disposal concepts (subseabed) and generic repository research, development and demonstration activities under the Energy Supply R&D appropriation rather than funds collected from the utilities and deposited into the Nuclear Waste or Interim Storage Fund. DOE has established a new decision unit entitled Civilian Radioactive Waste R&D to accommodate both the existing R&D activities and those pertinent to generic research and waste management initiatitves under the NWPA. As previously, mentioned, the FY 1985 budget request for the Civilian Radioactive Waste R&D activities is $27.64 million.

I would like to briefly discuss the highlights of the activities which we plan to undertake in FY 1985.

Spent Fuel Storage R&D

Spent Fuel Storage Research and Development consists of R&D activities supportive of the NWPA which mandates the Secretary to take such actions as necessary to encourage and expedite the effective use of available storage and necessary additional storage at each civilian nuclear power reactor. The FY 1985 budget request to support these activities is $13.2 million.

FY 1985 activities include the following:

- Perform tests and analyses to determine the conditions under which spent fuel can be safely stored, and to determine the means to assure that the safe conditions are not exceeded in various applications.
- Continue a joint DOE/Tennessee Valley Authority cooperative demonstration of licensed storage of spent fuel in two dry storage casks.
- Continue a joint DOE/Nuclear Fuel Services cooperative demonstration to transport spent nuclear fuel in a dry storage cask, store and test fuel and reship later in the same cask. This activity will be initiated in FY 1984.
- As required by Section 218 of the NWPA, participate with utilities and industry in the demonstration of new storage technologies to provide a data base for future NRC licensing actions. Three utilities were competitively selected in October 1983 to participate in either dry storage technology or rod consolidation at-reactor demonstrations. The three utilities are Virginia Electric and Power Company (VEPCO), and Carolina Power and Light (CP&L) which will participate in dry storage technology demonstrations; and Northeast Utilities Services Company (NUSCO) which will participate in a rod consolidation demonstration. These cooperative demonstrations are currently being negotiated. Demonstrations will begin during FY 1984. These tests will be funded primarily by the private sector with DOE providing up to 25 percent of costs in the form of facilities, services and direct funding.

Alternative Disposal Concepts

The FY 1985 budget request for alternative disposal concepts is $12 million. The efforts conducted in this area are done so under the Subseabed Disposal Program which is an international program under the Nuclear Energy Agency in which the U.S., the European Economic Community and seven other countries participate.

Subseabed disposal is the only alternative to mined repositories currently being studied by DOE. The primary mission of the subseabed disposal program is to assess feasibility of isolating radioactive waste within the stable sedimentary formations of the deep ocean floor. The FY 1985 subseabed program request will allow the Department to complete the technical, environmental and institutional feasibility studies by 1990.

The Subseabed Disposal Program is intended to coordinate our efforts with several other Federal agencies and international groups and to proceed toward the goal of determining overall technical and environmental feasibility of the concept. DOE will utilize the many laboratories, equipment and ships which were developed and operated by other agencies and international communities.

In FY 1985, the Alternative Disposal Concepts program activities on the subseabed concepts will include cooperation with other nations' seabed disposal program through the Nuclear Energy Agency of the Organization for Economic and Cooperative Development (NEA/OECD). DOE is participating in the International Seabed Working Group on a cooperative basis. Efforts will include environmental science studies, physical oceanographic and biology studies, sediment mechanical response studies and waste emplacement studies.

One of the major efforts in FY 1985 will include continuing the thermal program which includes the In-Situ Heat Transfer Experiment (ISHTE) to test capability of the subseabed to accept waste containers. This experiment is a critical path item for the completion of the subseabed feasibility assessment. It will allow completion of the measurement of in-situ sediment strength and heat transfer capability of the sediment through deployment by an international team. These measurements will be taken by U.S. and the international devices attached to the sea bottom platform. Also, in-situ measurements of hole closure following penetration of the sea floor through an international team effort will provide information critical to assessment of the containment capability of the sea floor.

The FY 1985 request also provides for the completion of the seafloor mapping of the Atlantic references sites, testing of in-situ hole closure using free-fall penetrometers, completion of the construction of the ISHTE test platform in FY 1985 for deployment in FY 1986, deployment and recovery of an ISHTE mock-up platform, completion of biological and ocean models for migration of radionuclides, and acquisition of field data on the major parameters necessary for the prediction of the degree of containment provided by the subseabed and the ocean.

Generic Methods and Supporting Studies

The FY 1985 budget request for generic R&D and supporting studies is $2.174 million.

The Generic Methods and Supporting Studies activities include three main areas of effort: international program support, special technical reviews, and waste management system studies. The thrust of these efforts is to assure adequate international cooperation, provide an independent assessment of the technical adequacy of the program, and evaluate potential alternatives which could improve the cost, schedule or technical aspects of the Civilian Radioactive Waste Research and Development programs.

During FY 1985, the Department's international program efforts will support bilateral and multilateral international agreeements. Summary reports will be prepared on the various international programs of the numerous countries emphasizing the status and planning of international waste management activities. At present there are agreements governing information exchange with six countries; they are: Canada, the United Kingdom, the Federal Republic of Germany, Sweden, Belgium and Japan. Discussion with four additional countries are expected to result in additional agreements.

In FY 1983 and FY 1984, a joint DOE/NRC Notice was published stating the U.S. intent to cooperate and provide technical assistance to non-nuclear weapons states in the field of spent fuel storage and sisposla. We have received expressions of interest from Egypt, Korea, the Netherlands and Brazil. Informal expressions of interest have also been expressed by other countries.

During FY 1985, support of special technical reviews by the National Academy of Science (NAS) assisted by the Department of Transportation, and the Bureau of Mines will continue for their evaluations of rock mechanics and tunneling techniques in support of waste management activities. Independent assessments of technical and programmatic issues related to the integration and conduct of the Waste Management and Fuel cycle activities will continue. DOE will also support nuclear fellowship and university programs in the waste management area.

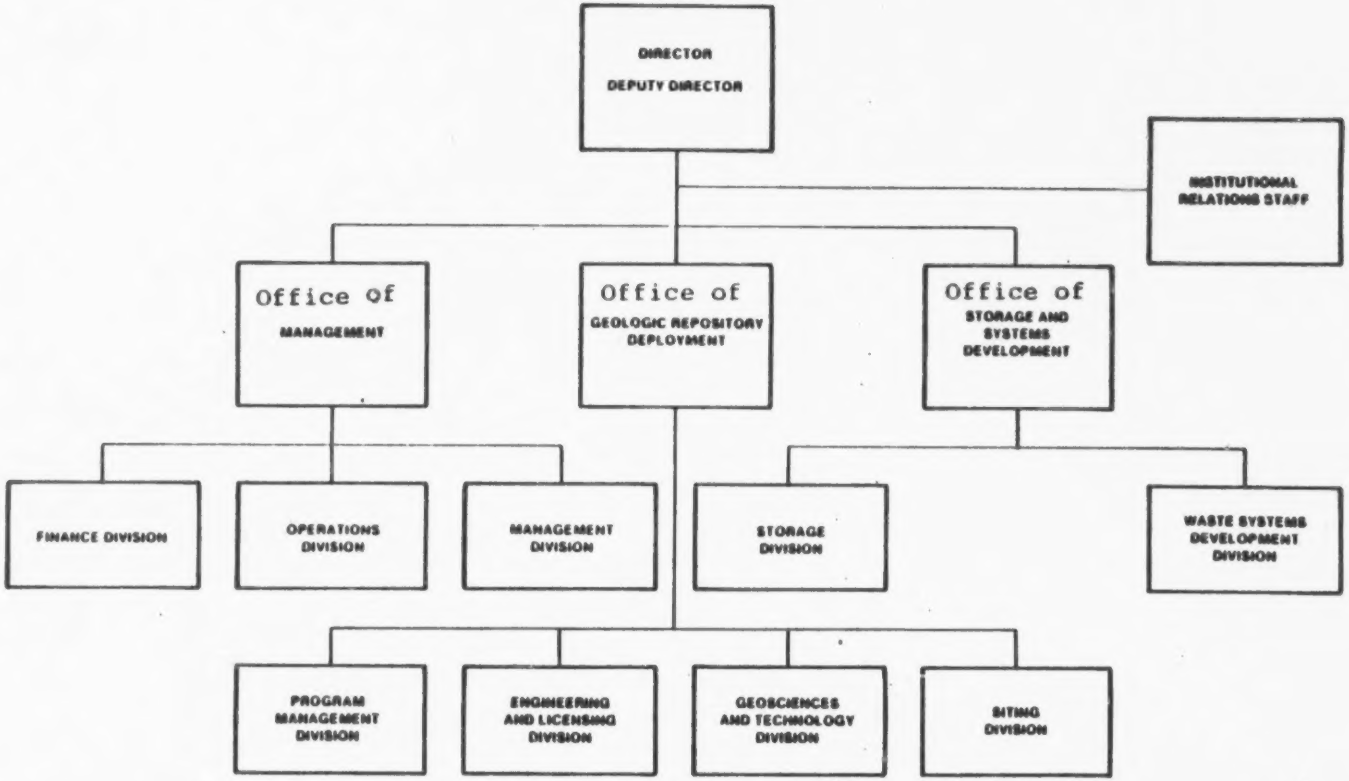
Program Direction

The FY 1985 budget request to fund five FTE's essential to manage the Civilian Radioactive Waste Research and Development programs is $266,000. The personnel required are located at DOE Headquarters and include administrative and technical talent who manage a broad range of activities, which include research, development, demonstration, industrial involvement, international and university programs. Their responsibilities include assessment of the technical progress, milestone progress, cost expenditures, guidance, overview and integration of all the contractor's activities, and initiation of appropriate actions to resolve problems in any of the R&D areas.

This concludes my remarks in support of the FY 1985 Nuclear Waste Fund Program and the Civilian Radioactive Waste Research and Development Program. I shall be pleased to answer your questions at this time.

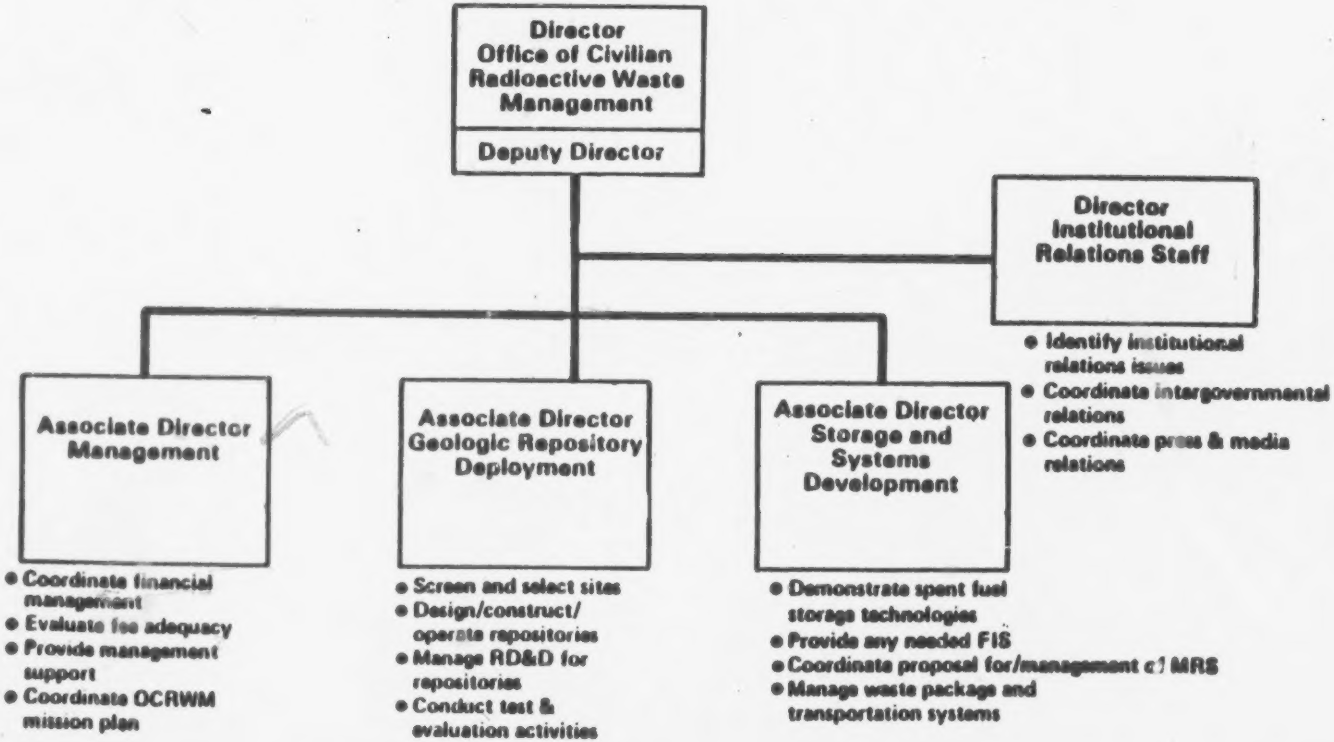
ATTACHMENT 1

DOE
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT


DIRECTOR
DEPUTY DIRECTOR
INSTITUTIONAL RELATIONS STAFF
Office of MANAGEMENT
Office of GEOLOGIC REPOSITORY DEPLOYMENT
Office of STORAGE AND SYSTEMS DEVELOPMENT
FINANCE DIVISION
OPERATIONS DIVISION
MANAGEMENT DIVISION
STORAGE DIVISION
WASTE SYSTEMS DEVELOPMENT DIVISION
PROGRAM MANAGEMENT DIVISION
ENGINEERING AND LICENSING DIVISION
GEOSCIENCES AND TECHNOLOGY DIVISION
SITING DIVISION

ATTACHMENT 2

Office of Civilian Radioactive Waste Management


Director
Office of Civilian Radioactive Waste Management
Deputy Director
Director
Institutional Relations Staff
• Identify institutional relations issues
• Coordinate intergovernmental relations
• Coordinate press & media relations
Associate Director
Management
• Coordinate financial management
• Evaluate fee adequacy
• Provide management support
• Coordinate OCRWM mission plan
Associate Director
Geologic Repository Deployment
• Screen and select sites
• Design/construct/operate repositories
• Manage RD&D for repositories
• Conduct test & evaluation activities
Associate Director
Storage and Systems Development
• Demonstrate spent fuel storage technologies
• Provide any needed FIS
• Coordinate proposal for/management of MRS
• Manage waste package and transportation systems

BIOGRAPHICAL SKETCH

Michael J. Lawrence is the Acting Director of the Office of Civilian Radioactive Waste Management, U.S. Department of Energy (DOE). The Office was established by the Nuclear Waste Policy Act of 1982 and is responsible for carrying out the radioactive waste management storage and disposal activities required by the Act. He is responsible for the siting, licensing and operation of geologic repositories for the permanent disposal of high-level radioactive waste, development of the monitored retrievable storage option, and the development of at-reactor storage capacity and limtied Federal emergency storage capacity for spent fuel. These programs have a 1984 Fiscal Year budget of $318 million.

In addition, Mr. Lawrence is Special Assistant to the Assistant to the Secretary for Field Operations. He serves as liaison for DOE field offices, the Bonneville Power Administration and Western Area Power Administration.

Prior to these assignments, Mr. Lawrence was the Deputy Director of the Office of Terminal Waste Disposal and Remedial Action, and was responsible for remedial actions at Federal and private sites, activities associated with the cleanup, treatment and disposal of wastes from Three Mile Island, and research, development and demonstration of waste treatment processes including the solidification of wastes at West Valley, New York, in addition to geologic repository programs.

Mr. Lawrence was Director of the Office of Nuclear Fuel Cycle at DOE and was responsible for the management and direction of nuclear spent fuel storage, reprocessing and transportation research and development programs. He was a U.S. representative to the International Nuclear Fuel Cycle Evaluation (INFCE) and the U.S. representative to the International Atomic Energy Agency's International Spent Fuel Management Expert Group.

Mr. Lawrence began his career with the Federal Government in 1969 with the Atomic Energy Commission (AEC) after graduating with honors in physics from the University of Maryland. He and his wife, Cindy live with their children, Mat, Jeff and Emily near Laytonsville, Maryland.

February 1984

OFFICE OF CIVILIAN NUCLEAR WASTE MANAGEMENT

Mr. LAWRENCE. Since passage of the act, the Office of Civilian Radioactive Waste Management has been established within the Department, reporting directly to the Secretary. Although, as the Secretary indicated when he was over here several days ago, a permanent director has not yet been named, but he does hope that the White House will be able to send to the Senate for confirmation in the near future the name of a candidate for the permanent director.

Senator JOHNSTON. Do you have any idea when that will be?

Mr. LAWRENCE. Sir, it is in the White House right now.

Senator JOHNSTON. The name is at the White House?

Mr. LAWRENCE. Yes, sir.

Senator JOHNSTON. Is that secret, or do you know?

Mr. LAWRENCE. No; that it is at the White House is known.

Senator JOHNSTON. Who is that?

Mr. LAWRENCE. Until the White House clears the name, sir, I am not at liberty to say. [Laughter.]

But I certainly hope it comes soon, sir.

Senator JOHNSTON. Does anybody know who that is? [Laughter.]

Can the press tell me who that is? [Laughter.]

All right, it is not a secret but it is a secret. Go ahead.

Mr. LAWRENCE. Yes, sir; during the past year, 70 contracts with 56 organizations have been signed to provide revenues for the disposal activities and monitored retrievable storage activities of the Department. The revenues collected as of the end of January have totaled $218.9 million. It is the objective of the Department and of the program to maintain the program within the funding which will be provided by the 1 mill per kilowatt-hour as specified in the act, but we will be reporting to the Congress in the summer with an annual report that is required to determine the adequacy of that fee.

One of the problems we have, Senator, is that with deferrals and cancellations of reactor projects, our revenue projections do change with time. Between last year and this year, the combined revenue projections through the 1987 time period have actually gone down $450 million. So this will be a continuing problem for us, but we hope to be able to manage around that.

POTENTIAL REPOSITORY SITES

With regard to our repository program, we have identified potentially acceptable sites for our first repository in six States, nine total sites. We have notified 17 States we are conducting studies for a possible second repository in those States.

The siting activities at all of those mine sites are continuing. We are analyzing collected data to provide sufficient information for us to make the nomination and recommendation to the President by January 1, 1985, of three sites for detailed site characterization.

One of the activities which we have conducted over the past year, which has taken a significant amount of time and effort, has been the development of generic siting guidelines for repositories. These are currently with the Nuclear Regulatory Commission for concurrence; and once that occurs—and we are hopeful that will occur by the end of April, early May—then we will be able to issue draft environmental assessments leading ultimately to the nomination and recommendation of sites.

MONITORED RETRIEVABLE STORAGE

Sir, I know you have a great interest and this committee has a great interest in the monitored retrievable storage program. During the past year, we have utilized the industrial experts on the concepts which we were considering for the MRS to develop detailed reports on those concepts, enabling us to make a concept selection. We also used independent reviewers comprised of industry, utility, and scientific community experts to review our decision.

A decision was reached in January of this year that we will go with the sealed storage cask concept as a preferred concept and drywell storage as an alternate concept for the MRS proposal. That proposal is on schedule, sir, and we will be submitting it to the Congress by June 1, 1985.

Senator JOHNSTON. The sealed storage cask, that is right at ground level, isn't it?

Mr. LAWRENCE. Yes, sir; it sits on the ground. As of right now, the concept we have is made of concrete, but in the selection we specified that the advances currently being made not only in the United States but around the world in metal casks, particularly metal casks suitable for transport, be looked at. Because as that technology is developed in this country and other countries, it may provide a very suitable and more economic and efficient system for monitored retrievable storage.

Senator JOHNSTON. And drywell?

Mr. LAWRENCE. That is emplacement into the surface with a tube or a casing, 14 to 16 feet long. Then the waste or the spent fuel is canistered and put down a sleeve into the surface.

Senator JOHNSTON. That is just, again, right at the surface.

Mr. LAWRENCE. Yes, sir; that is it.

The proposal we will submit to Congress in June 1985 will include detailed designs, cost estimates, construction schedules, engineering plans, and specifications, and will contain a deployment plan with a program for siting, development, construction, and operation of an MRS system, should it be required.

Finally, in the area of spent fuel storage, as you know, the Nuclear Waste Policy Act specified interim spent fuel storage was the primary responsibility of utilities. We have sought and found utilities which we would enter into cooperative demonstrations with for dry storage and rod consolidation. Those utilities are VEPCO, Carolina Power & Light, and Northeast Utilities.

In addition, we are working with the TVA and the Nuclear Fuel Services Co. to develop further technology for dry storage and rod consolidation, and with Nuclear Fuel Services on the development and demonstration of a transportable dry storage cask.

Although the act does provide for emergency Federal storage of spent fuel, based upon our discussions with the utilities, and the hopeful successful demonstration of the storage technologies, it is our belief that Federal storage of spent fuel prior to the 1998 date for Federal acceptance of waste or spent fuel, as required by the act, should not be necessary.

However, in the event it is, we have submitted to the Congress both Federal studies and deployment standards necessary for Federal interim storage, should that be required.

PROGRAM PLAN AND MILESTONES

Finally, sir, we are in the final stages of putting together the formal draft of our mission plan which will lay out our program planning and strategy for carrying out the storage and disposal requirements of the Nuclear Waste Policy Act.

We issued a preliminary draft of that plan in December. We received a number of comments on the plan, a number of good comments, which we are trying to factor in. But we are maintaining as our focus in this program the statutory and contractual commitment, which the Federal Government has, to begin accepting either spent fuel or commercial waste for disposal beginning in January 1998.

It is our belief that with the revised mission plan we will be able to lay out a number of scenarios and approaches whereby the public, Congress, and the industry and utilities can have confidence we can meet that date, either by a repository system or, if a repository system cannot be deployed due to some fatal flaw in the technology which we don't anticipate, or the inability to have it licensed by the NRC for permanent disposal, then the monitored retrievable storage plan will be available to meet that date, if authorized by the Congress.

Senator JOHNSTON. Repeat that, please.

Mr. LAWRENCE. If geologic disposal would not be available by 1998, either by some discovery of a flawed geology or technology, or the Nuclear Regulatory Commission could not license it for permanent disposal, then we feel it is essential that we have the monitored retrievable storage proposal and the concept and the plan for that ready to deploy and have in place if authorized by Congress no later than January 1998.

Senator JOHNSTON. You are talking about having that plan ready by 1998?

Mr. LAWRENCE. No; the actual facility and capability actually in place no later than that time, sir.

Senator JOHNSTON. How long do you consider the building time for that?

Mr. LAWRENCE. It depends upon the technology, sir. If it is the sealed storage cask, as we currently have as our preferred concept, construction would not take very long. You would have front-end facilities that would be required for the receipt and possible loading of those casks. However, if transportable storage casks are used and deployed for at-reactor storage, then even those front-end facilities for an MRS would be minimal. But I don't have an exact schedule. I won't have an exact schedule, sir, until the plan is submitted in June 1985.

Senator JOHNSTON. You are really planning to use MRS as a temporary storage until a repository is opened?

Mr. LAWRENCE. It depends upon the length of time we are looking at, sir. If a repository could be available, if it were on the horizon and you knew it was going to be licensed and just a matter of getting it constructed, it would still be up to congressional approval as to when that would come into place. We do not see MRS as a replacement or alternative away-from-reactor storage. The MRS system and concepts we have looked at would be used for up to 50 to 100 years or more of storage. But as a practical matter, the NRC would have to license it and the license is renewable on a 40-year basis. At least that is what they are telling us. But we certainly would look at MRS in the longer term and not as a temporary repository. However, in our mission plan we did not make that clear. It did imply that for a very short slippage in the repository you may want to deploy the MRS.

Based upon the comments we received, it was pointed out that that may not be the right interpretation, purpose, role, and scope of the MRS. We are looking to modify that.

TYPE OF STORAGE FACILITY

Senator JOHNSTON. I frankly don't think that this sealed storage is anything like what was intended. It certainly wasn't what I intended by an MRS. It looks like an AFR to me. It doesn't look like a facility. It looks like you take some casks and stick them in the sand out there. There is nothing in the legislative history of this act, which is replete throughout 3 or 4 years there is nothing like that kind of discussion, to just stick these things out in the desert somewhere. It is not a facility really to just stick them in the sand, is it?

Mr. LAWRENCE. Facilities would be required, and actually the Earth itself is part of the facility. It provides the bulk of the facility.

Senator JOHNSTON. You have the cask. You are talking about just sticking it in the sand.

Mr. LAWRENCE. For a cask, that would be placed on pads.

Senator JOHNSTON. Say that again?

Mr. LAWRENCE. They would be placed on pads, either concrete or asphalt pads, but sitting on the surface. The drywells would be set into the surface.

Senator JOHNSTON. A pad is a facility?

Mr. LAWRENCE. No, sir; but the receiving and handling facilities are facilities.

Senator JOHNSTON. What are they, trucks and cranes?

Mr. LAWRENCE. Cranes, offloading, hot cells for incapsulation, yes, sir.

Senator HUDDLESTON. What are we talking about in terms of size for these particular facilities?

Mr. LAWRENCE. The proposal will contain various sizes, ranging from capacities of 15,000 metric tons up to 70,000 metric tons, which is the limit for repositories as specified in the act.

Senator JOHNSTON. If all you are going to build is essentially a parking lot and some cranes to put these things in place, I don't know why it is taking such a gosh awful long time. I don't know, I think this MRS is a game with this administration to see how you can frustrate the intent of the act. I get mad every time I come to these hearings. It has been from the start a policy to frustrate the intent of the act.

Mr. LAWRENCE. Sir, I can assure you there is no intent to frustrate the intent of the act. We did look at eight concepts in reaching our decision for the MRS. They were casks, either metal or concrete casks, or casks actually in trenches, the tunnel drywell concept, open and closed cycle vaults, and then tunnel rack vaults. All of those concepts were looked at, with reports and detailed conceptual designs prepared for evaluation.

Senator JOHNSTON. What are you going to construct here? Literally it is a parking lot, isn't it?

Mr. LAWRENCE. Yes, sir. In regards to the sealed storage casks or the drywell, although it will be a very expensive parking lot, it is a rather straightforward technology and technology that has been demonstrated at our Nevada site and at our Idaho site. So one of the selection criterion——

Senator JOHNSTON. It doesn't have walls or a roof over it either, does it?

Mr. LAWRENCE. No, sir. The actual cask itself, or the earth in the case of the drywell, provides the protection for long-term monitored retrievable storage.

Senator JOHNSTON. That is the capsule itself. The facility doesn't provide for long-term protection; it is just the capsule.

Mr. LAWRENCE. That is right, sir. But both of these would meet all the NRC requirements for storage and would be licensed on a 40-year renewable basis, which meets the requirements for MRS.

Senator JOHNSTON. Well, we are talking about the facility, not the capsule. We had in mind the capsule which would be placed in a facility and the facility itself would last, not that you would just park them out on the deck somewhere.

All right. It is supposed to be also safely stored. It is safely stored if you keep everybody away from it.

Mr. LAWRENCE. No, it is safely stored. It would meet all the NRC facility licensing requirements; so it certainly is very safe and inherently safe. Both of these are inherently safe concepts.

PRIMARY CRITERIA

Two of the primary criteria used in the final selection were the inherent safety of the concepts and the flexibility of the concepts, because one thing we have learned with time is we really can't accurately predict what the waste disposal system or the requirements and needs will actually be 15 years from now. Both of these systems do have the capability to adapt to changing fuel cycle demands and waste disposal demands.

Plus, also in the concepts selection, the independent reviewers and our contractor and departmental reviewers did look at the safety and licensing ability of the concepts we were considering. These concepts came out among the safest and most licensable, contrary to some of the other concepts which were under consideration and which were not determined to have the same licensability at this time.

CASK CONSTRUCTION

Senator JOHNSTON. What is the cask made out of?

Mr. LAWRENCE. The cask that is the prime concept right now would be made of concrete. However, as I indicated, we are looking at the development of metal casks which would also be suitable for transport. I don't have the specifications. They haven't been developed yet. It would depend upon the age of the fuel and the quantity of fuel per cask.

Senator JOHNSTON. It would be thick enough to shield it against radiation. It would be radiation-proof outside that cask?

Mr. LAWRENCE. Sir, there is always some radiation, but a person could walk——

Senator JOHNSTON. There is not always some radiation. There is no radiation from what we had in mind. Four feet of earth will protect you from radiation.

Mr. LAWRENCE. Sir, a person could walk between the casks, but you would not have people——

Senator JOHNSTON. Better to run between the casks. [Laughter.]

Mr. LAWRENCE. That is right.

PUBLIC PERCEPTION

Senator JOHNSTON. One of the big problems with nuclear waste is the public perception. The technology for storage of nuclear waste is a relatively simple problem which virtually all the serious scientists agree upon. But all of this drill we are going through and all of these contortions—the hoops we are required to jump through, are required because of public perception, public perception being that nuclear waste is like a poison gas that lasts forever and that can escape and reach out and grab you, as somebody put it in one of these hearings.

Do you think the public is going to be pretty well satisfied with these casks sitting out on the desert somewhere, just out in the air, with radiation leaking? Can't you hear them now when they say, "Is radiation leaking from these casks?"

Mr. LAWRENCE. Sir, radiation would not be leaking from the casks. From a vault or from a repository, there could always be some radiation for a person in the facility itself, or in the field, but within acceptable limits, as specified by the NRC.

One of the benefits of these concepts, sir, is that we have in the past and can now take people to our Nevada test site. They can go out; they can see these storage concepts which the Department has developed and which have been under test now for some time. They can see it. We have long-term performance data on it. It has gotten a good reception from those members of the public who have taken the opportunity to look at it.

PROGRAM ORGANIZATION

Senator JOHNSTON. Is it still the plan to have the Director of the Office of Civilian Nuclear Waste Management also run the uranium enrichment program?

Mr. LAWRENCE. Sir, that will be Secretary Hodel's decision, but he did indicate at hearings on Monday that he was proposing that. At this point in time, he would not actually plan to do that until a director is confirmed by the Senate, and he indicated that he was not locked into that decision. He had his reasons for proposing that, but I am not actually involved in that decision process and don't know if he still intends to do that.

MRS SITE

Senator JOHNSTON. Are you hoping to build the MRS at a repository site?

Mr. LAWRENCE. No, sir. That is precluded by the Nuclear Waste Policy Act. So sites would be looked at in States in which a repository was not being considered.

Senator JOHNSTON. Senator Huddleston?

Senator HUDDLESTON. I have no questions.

Senator JOHNSTON. I have a number of questions here for Mr. Brewer, written questions, on the breeder reactor program, and also some on uranium enrichment. We'll submit those to you for a response.

HIGH TEMPERATURE GAS REACTORS

But I notice you have $35 million for HTGR, which is a change from the past. Why the change? Because Congress has put it in in the past?

Mr. BREWER. You just broke the code, Mr. Chairman. That, and the inherent technical attributes of the system. As you know, for the past 5 or 8 years this administration, and the previous administration, submitted a zero budget for the HTGR. Congress has repeatedly added the money back.

We feel that, for one thing, the program is unmanageable with that way of doing business. The program managers on the one hand are planning on termination at the same time that they are conducting an ongoing program.

The administration has decided to get in front of the power curve rather than behind it, to get out and lead rather than to follow. The technology has a number of attributes which you are quite familiar with. It has a very benign coolant. It is a nonradioactive coolant. You can walk up to the components and work on them hands on. Long response times for accident conditions and so forth. High-temperature applications, which sodium and water cannot reach.

Senator JOHNSTON. How much of the program will be directed at the so-called small, inherently safe HTGR?

Mr. BREWER. The vector for the program is toward the small reactor size. I would say in fiscal year 1985 about two-thirds of the $35 million. I will clarify that for the record. But we will carry along as a reference the lead plant, the large plant design work.

[The information follows:]

HTGR REQUEST

The fiscal year 1985 high temperature gas-cooled reactor (HTGR) program will concentrate on a comparative evaluation of small reactor systems that will have enhanced, passive, safety characteristics relative to the reference 2,240 MWt lead plant. Work will also continue on a technology program that is supportive of all types of HTGR plants as well as specific technology issues needed to be resolved that are unique to each small reactor concept. In this context, at least two-thirds of the total fiscal year 1985 funding can be considered applicable to the small modular reactor activities.

Senator JOHNSTON. I was pleased to see the administration get on board with HTGR. I think it is clearly an alternative that needs to be pursued. To call it the small, inherently safe, or to call it the other inherently safe, I want to tell my friends here in light-water breeder reactors that that doesn't imply that light-water reactors are inherently dangerous. It is a great safety record. I think there is some resistance on the part of people in the light-water business to say if you even talk about HTGR, it means the country is making the decision to abandon light-water reactors. That is not true at all. But I think it is prudent to examine what could be a very feasible alternative.

The phrase, indeed, inherently safe, relates more to fiscal safety, financial safety, as defined by Wall Street, than it does to actual harm to people. And it may indeed be more demonstrably safe to Wall Street to build than light-water reactors. But only time would tell that. In the meantime, I think we have to pursue that alternative.

I personally think that is a more immediate alternative than some of the money we spend on fusion, which doesn't mean we should abandon, in my view, the fusion program. But it does mean that fusion is sort of the basic science research program that is out in the dim future somewhere without a real purpose. You know, you can talk in vague terms about what we might do with fusion, but you can talk in real direct terms about what we can do with light-water and HTGR's. So I am glad to see you doing that.

FUTURE OF NUCLEAR ENERGY

What do you see for the future of nuclear energy? Do you see a comeback or continued phaseout?

Mr. BREWER. Mr. Chairman, I said a while ago that if we have a 3-percent growth rate in electrical demand, and I believe the last two quarters of 1983 were, in fact, 3 percent compared to the preceding year. If 3 percent or more is sustained over the next decade, we will have to double our capacity, the national capacity, in 25 years. That means another 500 gigawatts will be needed. Where are they going to come from? And that says nothing about replacing retired plants. That is new capacity.

Senator JOHNSTON. I happen to think you are right, that nuclear energy will have to make a comeback. But I fear the country is going to have to go through this cycle of saying, "No, you can't have nuclear energy." So, therefore, you go wholly to coal. And when they go wholly to coal, that increases the acid rain problem. Only then do you realize that we cannot depend 100 percent on coal. We are going to have to have a nuclear option for a balanced energy program. Whether that is sooner or later, in terms of years when that is going to become apparent to the public, which is the ultimate judge, I don't know. But I think the country will come to that conclusion. Especially in the meantime we can get some of the non-safety-related delays out of the way in building nuclear plants, and many of those, as you well know and as you suggest by the legislation that you sent up here, are non-safety-related. They are public related.

Mr. BREWER. And they are financially related—the inability of utilities to form capital or keep a project on schedule for financial reasons.

Senator JOHNSTON. That is right.

Senator Huddleston?

Senator HUDDLESTON. No questions.

ADDITIONAL PREPARED QUESTIONS SUBMITTED FOR THE RECORD

Senator JOHNSTON. Gentlemen, thank you very much. We also will put those additional questions in the record.

Mr. BREWER. Thank you, Mr. Chairman.

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR JOHNSTON

Light Water Reactors

Question: Mr. Brewer, as I see it, we have two problems--the present and the future.

In October 1981 President Reagan stated his support for both light water and breeder reactors. In light water, the state of affairs is more serious today than in 1981. What is the President's Council doing to help develop this energy issue?

Answer: This Administration has taken a significant step to help resolve one of the problems confronting the nuclear industry today. In March of 1983, a nuclear licensing and regulatory reform legislative proposal was submitted to the Congress. It would provide a more efficient, stable, and predictable nuclear licensing process. The objective of this nuclear licensing and reform legislation is to provide for continued improvements in public health and safety and to enhance public participation in the nuclear licensing process. Some activity on both the Administration's and the Nuclear Regulatory Commission's nuclear licensing proposal has begun in the Congress. We would urge rapid consideration of this most important legislative proposal. The President's Economic Recovery Plan has resulted in improved economic conditions that have resulted in an increased growth in electrical demand. This increased electrical demand will require public utility commissions to find methods to complete existing nuclear powerplant projects and to provide additional capital for both coal and nuclear plants.

Question: Where is limited funding for light water research and development? Are you abandoning the technical fixes which can help us today? (Extended fuel life is an example.)

Answer: As I have indicated earlier, the major problems confronting the light water reactor industry today are institutional, financial, and regulatory, and not technical. That is the reason why there is very limited funding for light water research and development. The Loss-of-Fluid-Test or LOFT international program is an example of an R&D program that would provide a better technical basis for nuclear licensing and regulatory requirements. The extended burnup program has been a success and the commercial fuel vendors at the present time are offering extended burnup fuel. Although there are benefits in terms of a modest reduction in power costs and less radioactive wastes for extended burnup fuels, these are not compelling issues that are preventing the further expansion of nuclear power in the United States.

Breeder Reactor Program

Question: Now that Clinch River is being terminated, what is being done to direct the breeder program so that we do not waste 30 years of development and billions of dollars of research?

Answer: It is indeed recognized that government investment in the breeder program has been substantial over the years. For example, funds spent on building major breeder facilities alone--

year of expenditure and excluding inventories--approach the $1.4 billion value. The replacement costs of such facilities would be over $2 billion--in 1983 dollars, excluding inventories. The progress of the research and development work has been documented well and reports are available to interested parties and/or the public, so it is safe to say that the Nation has not lost or wasted the benefit of those endeavors.

As to redirection of the breeder program to take advantage of 30 years of development and expenditures in the billions of dollars, the breeder base program has been restructured to focus on resolving those issues that are key to improved breeder economics and predictable, safe performance. Our R&D program complements industry efforts by emphasizing four principles: first, technology research and development necessary for a breeder system that has less complicated safety systems, is reliable, is competitive with alternative energy sources, and meets the market needs of utilities; second, development of advanced plant concepts; third, substantial international collaboration; and fourth, development of LMFBR fuel cycle technology. The technical expertise within the national laboratories and test facilities is being directed toward these ends.

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Nuclear Power Future

Question: As your statement indicates, nuclear power has had its share of setbacks lately. Moreover, it is now viewed as an unacceptable business risk by the nation's utilities. What is your view of the future? Will the Light Water Reactor (LWR) industry be revitalized?

Answer: In answering the first of these two questions, in the short term we believe that there will continue to be a number of cancellations of plants where significant investment is already committed. There are approximately 48 nuclear plants under construction at the present time. Approximately 25 percent of the projects have serious financial or regulatory issues that must be resolved for the project to go forward. It is not clear at the present time how or if these issues will in fact be resolved. In response to the second part of the question, the light water reactor industry must be revitalized as the United States needs both coal and nuclear power for large central station electric power generation. In the last year, as the economy has recovered, the electric growth rate has increased significantly, i.e., more than 3 percent for the past year relative to the previous year, and more than 8 percent for the last two quarters when compared to those same quarters last year.

Question: In your view, is fundamental change in the industry necessary--such as a shift to new reactor concepts?

Answer: There are fundamental changes required in the nuclear industry if it is to be revitalized. The fundamental changes required include a more efficient, rational, and stable nuclear licensing process, an increased capability for utilities to raise capital necessary for large central station powerplants be they coal or nuclear, and improved public acceptance of nuclear power. The fundamental problems with nuclear industry today are institutional, financial, and regulatory, and not technical. Therefore, most of the fundamental changes required are in these particular areas. However, advanced reactors, and in particular, smaller reactors will be examined carefully and objectively by the Department over the next year. These smaller reactors may be a better match to the institutions, that is the utilities. They may better match the grid size, the financial capability, and management capability of utilities. The interest during construction for these reactors would be less and the potential for central shop fabrication would make standardization easier, may result in better economics of mass production, facilitate better quality assurance, and shift the technical and regulatory risks from the utility to the supplier sector.

Nuclear Power Problems

Question: On page 2, you indicate that this "disturbing situation is the result of complex and interrelated economic, regulatory, and institutional problems, rather the technology." What are some of the specific problems?

Answer: Some of the major economic, regulatory, and institutional problems confronting the nuclear industry today are, first, an inefficient unpredictable, and unstable nuclear licensing and regulatory process; second, the inability of utilities to raise sufficient capital for large central station powerplants due to current rate regulation practices; and third, poor public acceptance of nuclear power.

Question: How much of the problem, in your view is poor utility--construction management of nuclear projects?

Answer: When many of the nuclear projects that are having difficulty today began in the early 1970's, their costs and the scope of the project were manageable. Since the early 1970's, the recession and inflation combined to reduce load growth and increased interest rates. At the same time, regulatory requirements were increased and the costs of the plants increased dramatically due to both an increase in these requirements, the inflation and recession, and unanticipated difficulties in constructing these powerplants. The public utility commissions were at the same time under pressure during these periods of inflation and recession to hold down electric rates and, attempting to do so, put additional financial pressure on the electric utilities. All of these factors combined made the management of nuclear projects extremely difficult. Some of the very best managed electric utilities were able to continue with their projects and complete them within reasonable costs and schedules. However, the average and poorly managed utilities have found it extremely difficult, if not impossible, to continue with their nuclear powerplant projects under these conditions.

Breeder Reactor Systems

Question: Comment on your efforts to refocus the base breeder program in light of the termination of CRBR. For the record, provide a detailed breakdown comparing FY 1983, FY 1984, and FY 1985, focusing on operating expenses and FTE's.

Answer: The breeder base program has been restructured to focus on resolving those issues that are key to improved breeder economics and predictable, safe performance. The federal R&D program complements industry efforts by emphasizing four principles: first, technology research and development necessary for a breeder system that has less complicated safety systems, is reliable, is competitive with alternative energy sources, and meets the market needs of utilities; second, development of advanced plant concepts including feasibility assessment with input from the user industry; third, substantial international collaboration; and fourth, development of LMFBR fuel cycle technology. The technical expertise within the national laboratories and test facilities is being directed toward these ends. Ultimate responsibility for breeder reactor commercialization including timing, funding, and management resides with the private sector.

Operating expenses and FTEs for FY 1983 and projected for FY 1984 and FY 1985 are herewith provided for the record.

Three-Year Comparison of Operating Expenses and Personnel
(Dollars in Millions)

	FY 1983		FY 1984		FY 1985	
	Operating Expenses	Average FTE	Operating Expenses	Average FTE	Operating Expenses	Average FTE
HEDL	$101.1	1,885-1,915	$ 96.2	1,740-1,790	$ 84.3	1,465-1,515
ANL	$ 78.5	1,360-1,380	$ 78.1	1,390-1,410	$ 69.8	1,290-1,310
ETEC	$ 23.2	325-350	$ 22.0	295-325	$ 21.8	275-300
ORNL	$ 10.5	500-520	$ 29.1	530-550	$ 15.1	385-405
LANL	$ 6.9	100-120	$ 9.3	110-130	$ 8.0	95-105

It should be noted that this data includes the Fuel Cycle program and that the FTE estimates are subject to undeterminable factors such as voluntary retirements or reassignments, timing of reductions-in-force, and so forth.

Energy Technology Engineering Center

Question: Please describe the ETEC project--under the base program--and explain the reduction in FY 1985.

Answer: The base program for FY 1985 will support the following activities at the Energy Technology Engineering Center: first, we will complete the installation of the 70-megawatt single-wall, helical coil tube steam generator model in the Sodium Components Test Installation or SCTI; second, we will begin system checkout and crew training for the test program associated with the 70-megawatt steam generator; and third, we will complete the installation of the Clinch River Breeder Reactor Plant prototype steam generator as an economizer in the SCTI to reduce testing costs of the 70-megawatt helical coil unit.

The proposed FY 1985 program represents a reduction of work. The previously planned testing of an 85,000 gallons per minute primary sodium pump has been deferred, and modifications to the Sodium Pump Test Facility to support this testing will be discontinued pending definition of future pump test requirements.

CRBR Closeout

Question: Discuss any problems with the closeout of CRBR activities.

Answer: The problems that have arisen are typical of those that occur in terminating a project of this magnitude, involving such activities as arranging for alternative use of the CRBRP site or redress of the site if no use can be found; settlement of almost 300 terminated subcontracts; arranging for the ultimate use or disposition of $500 million worth of components, materials, and other equipment; and establishing a mechanism for storage and retrieval of technical information developed during the course of the project. These are just a few of the activities which need to be accomplished. The Department's Oak Ridge Operations Office is responsible for managing termination activities of the Clinch River Breeder Reactor Project and has prepared a termination plan that describes the activities which need to be accomplished and their estimated costs.

The schedule for conducting the termination calls for completion by the end of FY 1985 at a total cost of $171.6 million.

Large Scale Prototype Breeder

Question: Why are no funds requested in FY 1985 for the Large Scale Prototype Breeder?

Answer: The Large Scale Prototype Breeder program has been a joint effort of the Federal Government and private industry to develop a large scale prototypical breeder demonstration plant. Private industry was to be responsible for the construction of the plant with the government aiding industry in the responsibility for the first of a kind plant costs. The plant was to have been the logical follow-on to the CRBRP project as a full-scale demonstration plant.

It is now clear that the responsibility for future demonstration plants will lie with the private sector. Therefore, the government-sponsored design efforts on a large scale prototype breeder plant will be phased out in an orderly manner during FY 1984. The LSPB design will be maintained as a frame of reference for benchmarking advanced concepts developed under the base program.

Question: Explain the current status of the program funded with $15 million in FY 1984.

Answer: In FY 1984, the LSPB plant conceptual design effort is being brought to an orderly completion. This will establish the LSPB as a cost and technical baseline reference for future breeder studies and safety evaluations. The current LSPB concept was developed in a joint effort that had been started in FY 1983 by the Department and the Electric Power Research Institute. The current concept achieved a major reduction in the dollars per kilowatt plant cost as a result of a number of simplifications and optimizations derived from an aggressive commercialization analysis, input from the utility industry, and consideration of international LMFBR design developments. To maximize the value of the LSPB as a cost and technical baseline, the FY 1984 conceptual design effort includes technical verification reviews, documentation of plant arrangements, structures, systems and components, and preparation of cost estimates, engineering and construction schedules, and safety discussion documents.

Concepts Requirements Development

Question: Explain the need for the new "concepts requirements development" effort.

Answer: The new concepts and requirements development effort is planned to stimulate new low cost, improved safety, liquid metal fast breeder reactor designs that will be attractive to users while providing a clear indication of research and development needs to be supported by the base program. In this fashion, the base program activities can be focused on those problems which will aid in the timely introduction of the breeder to the national energy mix. The overall objective of the effort is to develop one or more advanced concepts for safe, reliable LMFBR plants that will be competitive with alternative electric power generation sources and therefore be commercially deployable by the private sector.

Question: Provide a detailed breakdown of how the $19 million in FY 1985 would be allocated, including a list of vendors.

Answer: A detailed breakdown of the FY 1985 allocation is not yet established. A large amount of the funding will be awarded to contractors based on the results of a competitive procurement process which is now underway. The competitive procurement will be directed at developing one or more advanced concepts for safe, competitive liquid metal fast breeder reactor plants that can be marketed and deployed by the private sector. The effort will include the development of plant concepts, including drawings, analyses, assessments, cost estimates, and schedules.

Question: What role will EPRI play in this program?

Answer: Specific arrangements between DOE and EPRI are now being discussed with the intent of identifying their respective roles in the restructured program. EPRI, as a representative of the utility industry, will continue to play an important role in identifying utility requirements and providing technical and management assistance to the program.

Nuclear Fuel Cycle

Question: Provide your rationale for reducing the breeder nuclear fuel cycle program.

Answer: The reduction in the nuclear fuel cycle program is essentially due to deletion of funding for BRET, the Breeder Reprocessing Engineering Test.

Question: Why is no funding requested for the breeder reprocessing facility BRET?

Answer: Although the development of breeder reprocessing technology lags both fuel fabrication and reactor technology by a substantial margin, the Administration chose not to request funds for the BRET in FY 1985 due to higher priority requirements and a need for overall budget constraint. It is still the Department's plan to develop the capability for testing hot, prototype breeder reprocessing at an appropriate time in the future.

Uranium Enrichment Program

Question: The FY 85 budget request proposed some major surgery for the uranium enrichment program. Please explain in general terms for the Committee the need to reexamine the program and what major actions are proposed.

Answer: During the past 10 years, the United States position in the enrichment market has evolved rapidly from a monoploy to fierce competition. Our program and business practices have not kept pace with the changing market placing us at a disadvantage with our competitors. Our recent analysis of the world market, our competitors, and excess inventories have led us to conclude that continuation of the present course will be catastrophic to the uranium enrichment enterprise. United States sales and revenues would drop sharply while costs soar, which would force prices still higher leading to further sales losses.

To remain competitive in the worldwide enrichment business, DOE has developed a strategy which responds to the current market conditions. The key elements of our strategy are the issuance of a new contract to our customers, offering more attractive prices, taking steps to dramatically improve relations with our customers, operating each element of the enterprise in a cost effective manner, and allowing the market to drive decisions on investments for new capacity and research and development. We will compete by keeping prices down in the near term, being reliable and responsive to customer needs, developing new technology, and bringing new lower cost capacity on line as soon as feasible.

New Uranium Enrichment Contract

Question: What is the utility reaction to the new contract?

Answer: Reaction to the new uranium enrichment Utility Services contract has been very encouraging. As of March 12, 1984, one utility has signed the contract and 12 others have formally submitted letters of intent to convert to the new contract. In addition, many other customers have indicated a willingness and strong interest in converting. The total size of DOE's market which has expressed a desire to convert has now reached a level of 54 percent of DOE's total enrichment sales.

Gas Centrifuge Enrichment Plant

Question: I understand that the new strategy would slow and limit construction of the Gas Centrifuge Plant in Ohio (GCEP). Can you explain the actions proposed particularly with respect to the procurement of Set III machines which has been of particular concern to the committee?

Answer: Due to near-term reductions in enrichment demand and the potential for significantly enhanced economics from the introduction of the advanced gas centrifuge into GCEP, construction of the GCEP project will be slowed and limited to process buildings 1 and 2. Construction beyond these first two buildings will be determined by the market response to the new Utilities Service contract and the advanced technology decision, scheduled for May 1985. Consistent with this strategy, the production of Set III centrifuges will be slowed to a minimum sustaining level at the three centrifuge manufacturers. Our economic analyses indicate that it is preferable from both Government expenditure and industry viability standpoints to continue Set III production at a low rate, rather than to terminate and restart production of Set V centrifuges at a later date.

Enrichment Technologies

Question: With respect to the advanced enrichment technologies--Set V machines and the laser process--your budget reduces funding for these two new technologies. Please outline your new development strategy. What are the total estimated savings from this new approach?

Answer: Our proposed advanced technology program development strategy is to demonstrate each of the technologies at significant scale, to complete evaluations of the reliability of various subsystems and to generate engineering data that will establish a reasonable estimate of production costs. Specifically, in the Advanced Gas Centrifuge (Set V) program, centrifuge machines with the potential of producing 600 SWU/machine year will have been tested for approximately 6 months as well as mechanical testing for more than one year to verify their technical performance. The fabrication of these centrifuge machines and their subsystems will provide a well defined cost estimate for the Set V machines.

In the Atomic Vapor Laser Isotope Separation program, enrichment runs at greater than half scale will be performed prior to the technology selection. Lifetime tests of essentially full sized laser and separator subsystems are underway now and these systems will have operated for approximately 25 percent of their expected life by May 1985. These tests, along with an updated preconceptual design should provide a sound estimate of capital and production costs for AVLIS. DOE believes that their funding levels are adequate to support a May 1985 selection.

Question: Do you envision problems with picking one of the advanced technologies in FY 85?

Answer: We believe a high confidence selection can be made in mid-FY 1985 provided that the AGC and AVLIS development teams are successful in providing the levels of demonstration that are planned.

Uranium Enrichment Power Costs

Question: High power costs for the Gaseous Diffusion plants are a concern to the Committee. Provide a breakdown of the power costs over the last 5 years and estimates for the next 5 years.

Answer: Unit power costs for each of the power suppliers are shown below. The costs for FY 1980 through FY 1983 are actuals. The FY 1984 and FY 1985 figures are our current estimates.

Supplier	Fiscal Year (mills per kilowatt-hour) 1980	1981	1982	1983	1984	1985
Tennessee Valley Authority (TVA)	24.0	29.0	32.8	33.1	34.5	36.4
Electric Energy Incorporated (EEI)	18.7	22.1	19.1	20.9	22.5	23.8
Ohio Valley Electric Corp. (OVEC)	18.5	20.7	19.2	18.8	18.0	18.9

The TVA unit costs for FY 1981 through 1985 exclude capacity charges for power not purchased. Inclusion of these additional costs distort the TVA unit costs. For the next 5 years, we expect the unit costs to escalate at or slightly below the general rate of inflation.

Question: Describe the problem and any progress being made to obtain relief from TVA demand charges.

Answer: The Department is committed to evaluating all feasible ways of minimizing our total power costs from all three suppliers. With respect to disposing of the TVA power that is excess to our needs, TVA has taken the position that to allow DOE to dispose of the power would violate the TVA Act which prohibits TVA from being a direct or indirect source of power outside its region. We maintain that the Department has the right to dispose of any excess power by taking title to the energy and making a sale under authority of Section 161g of the Atomic Energy Act of 1954, as amended. The cited section authorizes the Department of Energy to directly dispose of property excess to its needs in order to implement its programs. In this regard, no specific exemption from Section 15d of the TVA Act is needed as the sale is by DOE, not TVA or its distributors.

It would, of course, be necessary for TVA to agree to the arrangement and deliver the power and energy to the perimeters of its service area. Discussions are continuing with TVA in order to arrive at a mutually acceptable resolution of this problem.

The Department is also searching for utilities that need power or could economically substitute the TVA power or power from other suppliers for power they currently obtain from other sources. Discussions with TVA, EEI and OVEC are continuing.

Gaseous Diffusion Plant Operations

Question: Describe in more detail efforts to reduce outlays for GDP operation.

Answer: The DOE with the cooperation of the operating contractors for the three GDP's put in place in 1981 a comprehensive program aimed at increasing operating efficiency and reducing costs. Strict controls on outlays for capital equipment additions and replacement have been instituted. The contractors have established quality awareness and involvement throughout the organizations in an effort to create cost awareness at all levels. GDP contractors have strong maintenance management programs to assure that the facilities are operated efficiently and that expensive and unnecessary fixes are avoided. The contractors efforts are reviewed periodically by DOE field office and headquarters program office personnel.

These efforts have shown very positive results to date. Since FY 1981, the escalation of GDP operating cost have been significantly less than the cost price index for the period, even though wages and benefits were increased about 8 percent annually under existing labor contracts. During that period, costs have been about 6 percent lower than they would have been if escalated at the CPI rate. This is a major achievement when the higher costs of meeting increasingly more stringent requirements for safety, security and environmental protection are taken into consideration.

Question: Discuss the possible curtailment or closure of the most expensive GDP operations. Is this option under review and what conditions would trigger this action?

Answer: All capacity decisions, including the shut down of a gaseous diffusion plant, will be driven by response to the new contract. Acceptance of the new contract will provide the firm sales base needed before a decision can be made on when and which of the GDP's could be shut down. An assessment of GDP shut down will be completed in 1985.

Nuclear Waste Program

Question: In recent weeks, some utilities and the utility industry have become more critical of the Departments implementation of the Nuclear Waste Policy Act. The principal criticism is the preoccupation with process at the expense of the deadlines laid out in the Act. Is the availability of funding (from utility revenues -- 1 mil per kilowatt hour fee) slowing progress? If so, should we consider increasing the utilities' fee?

Answer: As we proceed, we will be not only reviewing annually the adequacy of the fee, but will be continually monitoring program progress and the availability of funds. If at any point availability of funds constrains program progress, DOE will assess the available options, including borrowing from the Treasury or increasing the fee, as provided for in the Act.

Loss-of-Fluid-Test Program

Question: Briefly describe the international program on reactor response and safety at the LOFT facility.

Answer: In February 1983, under the auspices of the Nuclear Energy Agency of the OECD, the Organization for Economic Cooperation and Development, a consortium of nine countries, including the United States, formed to carry out the OECD-Loss-of-Fluid-Test or LOFT Program. At that time, the members pledged sufficient funding for a 3-year program composed of six thermal-hydraulic experiments and two fission product release and transport experiments. The LOFT facility, which until that time had been dedicated to the Nuclear Regulatory Commission safety research program, was to to be the test vehicle for this new program.

Question: What is the current status, total cost, and level of federal, private, and international participation?

Answer: The program is continuing on schedule and within budget. All of the thermal hydraulic experiments have now been completed, while planning, fuel fabrication, and instrumentation development are well underway for the final two experiments intended to study fission product release and transport.

In preparation for these two experiments, specialized measurements systems are being developed to permit both on-line and post-test analyses of the quantity and species of fission products released and their transport and deposition in an aerosol environment resulting from the vaporization of control rod materials. The results are intended to provide important information relevant to the source term issue.

The total cost of the program is planned at $91.21 million, of which $70 million will be supplied from federal sources, $1.5 million from U.S. industry, and $19.71 million from foreign sources. To date, approximately $43 million has been spent.

Reduced Enrichment Research and Test Reactor

Question: Again this year there is no request in DOE for the RERTR subprogram but apparently a request is contained under the Arms Control and Disarmament Agency. How much is requested and what will be accomplished?

Answer: It is our understanding that the FY 1985 ACDA budget includes $4.9 million for the RERTR--Reduced Enrichment Research and Test Reactor--Program.

In general, efforts will continue in FY 1985 to provide the technical means through development and demonstration of alternative fuel systems for conversion of research and test reactors from use of HEU--highly enriched uranium--to LEU--low-enriched uranium--fuels. Assuming Congressional authorization of the required funding, major specific activities and accomplishments in FY 1985 will include qualification of U_3O_8 fuel systems for appropriate LEU applications; completion of procurement of high density silicide fuel for the full core demonstration of LEU in the Oak Ridge Research Reactor; continuation of analytical studies of conversion potentials and evaluation of HEU export requests; continuation of development of high uranium density silicide fuels, via irradiations--post irradiation examinations--and data processing; continuation of participation in joint studies with reactor operators for converting their specific reactors to appropriate LEU-fuels; and completion of the International Atomic Energy Agency Guidebooks for conversions of research and test reactors to appropriate LEU fuels.

Question: Does the ACDA have the capability and expertise to continue the program?

Answer: Although funding would be with ACDA, it is expected that responsibility for technical administration of the program will continue to be shared with, and conducted through, DOE and that ANL--Argonne National Laboratory--will continue the day-to-day technical management and program coordination activities.

Question: Will DOE personnel be involved?

Answer: We are planning to have current DOE and ANL personnel to continue to actively participate in completion of program activities which are required for timely implementation of the planned conversion policy.

Remedial Action Program

Question: Specifically, how does the Department plan to use the large increase requested in the uranium mill tailings program?

Answer: The Uranium Mill Tailings Remedial Action, or UMTRA, Program is responsible for conducting remedial actions at 24 sites and several thousand associated vicinity properties as mandated by Public Law 95-604. The FY 1985 budget request reflects the UMTRA Program's transition from the planning and environmental analysis phase to the detailed engineering and construction phase. The increased funding level is required to accelerate work on the high-priority processing sites and vicinity properties and to establish the project pace and momentum necessary to meet the 7-year schedule mandated by the Law.

Question: Provide a list of sites with allocated funding and planned activities.

Answer: Provided for the record is a listing of the sites on which work will be underway in FY 1985, funds allocated to each, and a brief statement of the work to be accomplished.

UMTRA Site Work in FY 1985

Canonsburg, Pennsylvania, $10,537,000--Continue processing site remedial action and accomplish cleanup of 33 vicinity properties for a total of 111.

Salt Lake City, Utah, $14,724,000--Continue processing site remedial actions and accomplish cleanup of 29 vicinity properties for a total of 59.

Shiprock, New Mexico, $5,681,000--Complete 60 percent of processing site remedial action and cleanup approximately 8 vicinity properties.

Durango, Colorado, $6,038,000--Complete engineering, design, remedial action plans and environmental documentation and initiate remedial action at the processing site. Cleanup approximately 34 vicinity properties.

Gunnison, Colorado, $682,000--Complete approximately 50 percent of the engineering design for remedial action at the processing site.

Grand Junction, Colorado, $6,496,000--Continue work on the remedial action plans and conceptual designs for the processing site. Cleanup approximately 178 vicinity properties.

Rifle, Colorado, $485,000--Continue work on the remedial action plans and conceptual design for the site.

Riverton, Wyoming, $3,082,000--Complete the engineering design of the remedial action for the site. Complete the cleanup of 8 vicinity properties.

Tuba City, Arizona, $712,000--Complete the environmental documentation, remedial action plans and engineering design on the processing site. Cleanup 8 vicinity properties.

Mexican Hat, Utah, $587,000--Complete remedial action plans, and start the design engineering for the processing site.

Lakeview, Oregon, $389,000--Complete the environmental documentation and remedial action plans for the processing site.

Ambrosia Lake, New Mexico, $488,000--Complete the environmental documentation and start the remedial action plans and conceptual design for the site.

Naturita, Colorado, $418,000--Complete the environmental documentation and start the remedial action plans and conceptual design for the site.

Fall City, Texas, $5,000--Minor planning and support costs.

Maybell, Colorado, $289,000--Complete most of the environmental documentation and start the remedial action plans and conceptual design for the site.

Lowman, Idaho, $5,000--Minor planning and support costs.

Converse County, Wyoming, $10,000--Minor planning and support costs.

Monument Valley, Arizona, $159,000--Complete the environmental documentation and start the remedial action plans and conceptual design for the site.

Edgemont, South Dakota, $846,000--Cleanup approximately 21 vicinity properties.

Question: Give us an update on past accomplishments and planned activities at Canonsburg and the Salt Lake City site?

Answer: With respect to Canonsburg, the Final Environmental Impact Statement was published in July 1983, and the Record of Decision was made in September 1983. The Remedial Action Plan, including the Site Conceptual Design, was completed in October 1983 and construction work at the site was started at that time. By the end of the construction season, a catch basin to collect runoff had been installed, and the site had been fenced.

The engineering design for Canonsburg was completed in January 1984. Work at the site will resume as soon as weather permits--

about April 1, 1984. The work is scheduled to be 35 percent complete by the end of FY 1984. The remaining work will be completed in FY 1985.

Work on the vicinity properties will also be completed in FY 1985. Cleanup of an estimated 33 properties will be accomplished in FY 1985, bringing the total to 111.

With respect to Salt Lake City, the Department, in October 1983 selected the relocation of the tailings to Clive, Utah as the preferred remedial action option for this site. The proposed disposal site at Clive, located about 90 miles west of Salt Lake City, was recommended by the State.

The Final Environmental Impact Statement reflecting the preferred option is scheduled for publication in May 1984. The Remedial Action Plan, including the Site conceptual Design, will be completed in June 1984.

In connection with the decision to relocate the tailings, the State of Utah offered to increase its share of the funding of the cost increase associated with the relocation to Clive from the 10 percent required by the Act, to 25 percent provided that the State be given responsibility for the management of the engineering and construction phases of the project. An agreemment implementing these changes was executed on March 6, 1984.

Every effort will be made to minimize any delay in making the transition from DOE to Utah management, and the start of remedial action is still targeted to begin within FY 1984. During FY 1985 substantial investments will be required in equipment and facilities required for the transport of the tailings. Work preparatory to loading the tailings at Salt Lake City and to receiving the tailings at the new disposal site at Clive will be underway.

Although the planning and conceptual engineering for the relocation option has not progressed to the point of establishing a new completion date, it is estimated that time required for the transport of the tailings will delay completion by at least one year, that is, until late FY 1988.

During FY 1985, an additional 29 properties will also be cleaned up, bringing the total completed to 59.

West Valley Project

Question: Briefly provide the Committee with the current status of the West Valley Project?

Answer: The West Valley Demonstration Project is proceeding on schedule and within budget toward completion of the solidification of the stored high-level waste by the end of 1990. Currently no major technical obstacles are foreseen that would challenge this schedule. The central task of the West Valley Demonstration Project is solidifcation in borosilicate glass of the high-level radioactive waste stored in underground tanks at West Valley. In order to begin vitrification at the earliest practical date, the Project strategy is to meld known technology into a viable system and to test the key components of that system in nonradioactive operation and then convert the system to radioactive operations. This testing will confirm process design, verify remote operability, refine operating procedures, and train personnel. At this time, construction is underway for the Component Test Stand, the liquid-fed ceramic melter, and associated feed subsystems. Start of borosilicate glass production using simulated West Valley waste is scheduled for May 1985; start of radioactive operation is planned for late 1988. Work continues on techniques to mobilize the sludge waste in the underground tanks and move it to the melter feed system. Decontamination of those existing facilities planned for use by the Project continues. Simultaneously, routine site maintenance and operations are being carried out.

The major accomplishments during the past fiscal year include: selection of a reference form, borosilicate glass, for the high-level radioactive waste; selection of the waste solidification process--joule heated or slurry fed ceramic melter; construction start on the Component Test Stand for the solidification system; waste tank sampling and characterization; selection of an architect/engineering firm; construction of a waste tank scale model for sludge removal testing; and major start on decontamination of the processing plant for project use.

During FY 1984, the major activities being addressed by the project include sludge removal equipment testing in the waste tank scale model, completion of major procurements and construction of the Component Test Stand or CTS, completion of CTS conceptual design modifications preparatory to conversion of the CTS to radioactive operation, and continuation of plant decontamination tasks. During FY 1985 significant progress is expected on nonradioactive operation of key high-level waste solidification components and removal of equipment and vessels from the large chemical process cell.

Question: Explain why there is a need for the increase in FY 1985?

Answer: In accordance with Public Law 96-368, the West Valley Demonstration Project will demonstrate the solidification of the high-level waste stored at West Valley. The most effective demonstration will be the expeditious completion of waste solidification and preparation for permanent disposal. The inherent annual base cost for operations has been identified as the single most important element whereon cost cutting measures can be effective. Within reason, a 2-year change in schedule, while holding to essential project objectives and efforts, has been projected to mean a $20 to $50 million cost difference. A reduced funding level would result in a significant increase in the total project cost estimate and a significant delay in the programmatic goal of a public large-scale demonstration without gaining a meaningful annual budget reduction. Completion of the project on an as soon as practical basis will minimize costs to both the federal and New York State governments.

The increase in the West Valley Project is primarily for completion of the vitrification Component Test Stand so as to begin nonradioactive testing in 1985 of the key components in the solidification system and to initiate equipment design and procurements needed to maintain the schedule leading to processing of high-level waste in 1988. An increase is also required for treating--for example, low-level radioactive waste treatment system--and handling of the increased quantities of low-level and transuranic waste produced by decontamination activities for preparing existing cells for re-use by the project.

Question: How much is the total estimated cost for the project, how much is this over the earlier estimates, and why has the cost increased?

Answer: As of November 1983, the West Valley Demonstration Project baseline cost estimate, through high-level waste solidification, was $381.5 million in constant 1984 dollars--$472.8 million in year of expenditure dollars. The project baseline includes the start of radioactive operation of the liquid-fed ceramic melter in September 1988, with completion of solidification by the end of 1990.

The West Valley Demonstration Project Act, Public Law 96-368, included a provision to undertake detailed engineering and cost estimates for the project. A range for the total estimated cost of the project was provided in House Report 96-1100, Part II, from the Committee on Interstate and Foreign Commerce, dated September 15, 1980, which accompanied H.R. 6865. This report provided an estimate of the total project cost between $250,000,000 and $500,000,000 in 1980 dollars. The November 1983 cost estimate is equivalent to $297,000,000 in 1980 dollars.

Three-Mile Island Cleanup

Question: With regard to the cleanup at TMI and the Federal R&D effort, what is the current estimate of costs?

Answer: The last TMI Unit 2 Recovery Program cost estimate prepared by GPUNC--GPU Nuclear Corporation--in December, 1982, indicated a total estimated cleanup cost of $975 million. As of September 1, 1983, $384 million of this amount has been spent.

The Department of Energy TMI-2 research and development program amounts to a total of $159 million, of which approximately $72 million has been expended as of October 1, 1983. Although the focus of DOE's R&D Program is generic development for the benefit of the nuclear industry as a whole, about one-half of the total DOE program funding, $80 million, supports R&D tasks that offset costs which otherwise would be borne by GPU.

Question: What is the current funding status of the project?

Answer: The DOE R&D program has expended about $72 million of the $159 million total program funding through the end of Fiscal Year 1983. The FY 1984 appropriation for DOE's R&D program is $37 million. GPUNC has expended $384 million of the total estimated cleanup cost of $975 million through September 1, 1983. GPUNC is continuing their efforts to obtain commitments for funding contributions from various sources in accordance with the cost sharing plan proposed by Governor Thornburgh of Pennsylvania.

Question: Is the federal role still limited to research and development?

Answer: The DOE role is limited to research and development activities, including data acquisition, reactor evaluation, and abnormal radioactive waste disposition, that are of general national benefit and that ensure the safe disposal of wastes.

Question: How much is GPU obligated to reimburse DOE at this time? In total?

Answer: GPU is not obligated to reimburse DOE for research and development tasks which DOE conducts since these are generic tasks of benefit to the entire nuclear industry.

There are a few areas, however, where DOE is performing services for GPU. In this regard, GPU has recently signed a contract with DOE which calls on GPU to pay DOE $7.3 million to remove, store, and dispose of the TMI-2 core. GPU has also agreed to reimburse DOE approximately $1.4 million for costs associated with shipment of EPICOR-II liners from interim storage at the Idaho National Engineering Laboratory to the State of Washington for ultimate disposal.

Should DOE perform additional removal, storage, and disposal of some wastes which cannot be disposed of in commercial low level waste facilities, GPU will be required to provide reimbursement to DOE.

Question: Has there been any reimbursement?

Answer: To date, there has not yet been any reimbursement. Reimbursement will be made when the corresponding DOE services are performed.

Question: When is reimbursement expected?

Answer: Reimbursement for acquisition of the TMI-2 core will be in the mid-1986 through 1987 time period. Reimbursement for shipment of the EPICOR-II liners will be in 1984 and 1985.

SUBCOMMITTEE RECESS

Senator JOHNSTON. The subcommittee will stand in recess until 10 a.m. on March 21.

[Whereupon, at 3:35 p.m. Wednesday, March 7, the subcommittee was recessed to reconvene at 10 a.m. Wednesday, March 21.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

WEDNESDAY, MARCH 21, 1984

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcomittee met at 10:01 a.m. in room SD-192, Dirksen Senate Office Building, Hon. Mark O. Hatfield (chairman) presiding.

Present: Senator Hatfield.

U.S. NUCLEAR REGULATORY COMMISSION

STATEMENT OF NUNZIO J. PALLADINO, CHAIRMAN

ACCOMPANIED BY:
- VICTOR GILINSKY, COMMISSIONER
- JAMES ASSELSTINE, COMMISSIONER
- FRED BERNTHAL, COMMISSIONER

INTRODUCTORY REMARKS

Chairman HATFIELD. The hearing will come to order.

Today, we will receive testimony from the Nuclear Regulatory Commission and the Federal Energy Regulatory Commission regarding their fiscal year 1985 budget requests. The subcommittee has a great interest in the programs and activities of both these regulatory agencies and we look forward to your testimony this afternoon.

As our first witness, we are pleased to welcome Dr. Nunzio J. Palladino, Chairman of the Nuclear Regulatory Commission and also Commissioners Asselstine and Bernthal. We are happy to welcome all of you gentlemen here this morning. If you would like to summarize, Mr. Palladino, your testimony, we will place the full statement in the record.

Mr. PALLADINO. Thank you, Mr. Chairman. It is a pleasure to be back with you to discuss the NRC budget request. As you indicated, with me today are Commissioners Asselstine and Bernthal. Commissioner Roberts in unable to be with us today. We also have with us the Executive Director for Operations, Mr. William Dircks, and the Directors of the principal offices of the Commission. In order to permit more time for responding to questions, I have shortened my oral presentation. But, with your permission, I would like to have the entire testimony entered into the record.

BUDGET OVERVIEW

First, I would like to provide the subcommittee with an overview of our budget request. For fiscal year 1984, we requested $466.8 million and we were given $465.8 million in budget authority. For fiscal year 1985 we are requesting $468.2 million. My prepared testimony includes a summary table of obligations by program for fiscal years 1983, 1984, and 1985 as well as several charts showing the allocation of resources to the agency since its creation in 1975. For your convenient reference, I have also provided your staff with copies of the latest table showing the current status of nuclear powerplant units in the United States.

With respect to our budget request, both in actual dollars and in constant dollars, the research budget has declined since fiscal year 1981. We have cut our research budget as far as we can and still carry out needed work. A well-focused and effective research program must be maintained because it provides the technical basis on which to improve our licensing and inspection programs and to make regulatory decisions.

Our budget this year includes a modest increase in staff for fiscal year 1985 because we believe that there is little room left for further internal reallocations. The increase of 75 FTE for fiscal year 1985 is needed to help deal with our stepped up inspection efforts and our increased responsibilities under the Nuclear Waste Policy Act.

While we have been able to reallocate some staff from licensing efforts, this option is limited because the licensing load has not dropped as fast as one might have expected based on the utilities' startup schedules. Plants troubled with construction or startup problems make it necessary to stretch out the licensing process. The additional NRC analyses required to resolve these problems add to the licensing workload.

NRC's programs are not of a discretionary nature. They are critical to our regulatory mission. Our capacity to answer technical questions, to resolve expeditiously a myriad of engineering issues, and to assure proper completion and safe operation of nuclear plants is severely strained. Although we believe our progress in improving the regulatory program is enhancing safety, incidents continue to occur in nuclear power operation. It is essential that adequate funding and staff be provided to enable NRC to discharge fully its responsibility to ensure that the public health and safety is adequately protected.

LICENSING REFORM

Mr. Chairman, I will now touch on several topics of special interest to the NRC. These are licensing reform, temporary operating licenses, emergency preparedness, TMI–2 cleanup, and the continuing need for consolidation. My comments on each will be brief.

First, licensing reform. Enactment of a licensing reform bill along the lines of that proposed last year by the NRC could contribute much needed stability to the nuclear licensing process. While licensing reform is by no means a cure-all for the problems confronting nuclear power in the United States, it would be useful to establish now, by law, a stable framework within which future nuclear industry planning can take place.

Several features of the NRC bill are key to meaningful licensing reform. These include standardized design, early site review, and authorization of a combined construction permit and operating license. Site and standardized design approvals should be valid for approximately 10 years, with renewals from 5 to 10 years at the discretion of the Commission. With respect to a combined construction permit and operating license, a second hearing prior to commencement of operation should be limited to issues that were not and could not have been considered and decided at earlier stages.

TEMPORARY OPERATING LICENSES

Let me turn next to a few comments on temporary operating licenses. Although no applicant requested a temporary operating license for a nuclear powerplant prior to December 31, 1983, when NRC's authority to issue such a license expired, the potential for licensing delays, which led to the authority provided in Public Law 97–415, continues to exist today.

The Commission believes that it would be desirable to extend its authority to issue temporary operating licenses. Our recommendation is made with the clear understanding that such authority would be exercised sparingly and only when it is clearly demonstrated to the Commission that operation would involve no undue risk to the public health and safety.

In the Commission's view, this authority is an important tool for dealing with situations that might arise where construction gets ahead of our schedule. I should note, Commissioners Gilinsky and Asselstine do not believe there is a need to extend the temporary operating license provision.

EMERGENCY PLANNING

The third topic of special interest is emergency planning. In principle, the Commission believes that failure of a State or local government to plan, or to implement plans, should trigger a requirement that other alternatives for protection of the public be considered. It is, therefore, important to preserve the language in last year's authorization bill that permits the Commission to issue an operating license for a nuclear power reactor, if it determines that there exists a State, local, or utility plan which provides reasonable assurance that public health and safety are not endangered by operation of the facility.

It is also important for the Congress to work with FEMA and NRC to come up with a solution to the problem of legal authority in the absence of State or local government participation. A possible approach would be to make available Federal resources if a governor requested them.

CLEANUP OF TMI UNIT 2 REACTOR

The fourth topic of special interest is the cleanup of the TMI unit 2 reactor. Recent events hold some promise of help for the utility's efforts to secure committed funding for future cleanup activities. However, they do not provide much confidence that the approximately $600 million effort still remaining will be adequately funded or expeditiously completed. Given the existing funding uncertainties and the formidable technical problems that the utility must overcome, the Commission has serious reservations about GPU meeting its current schedule for completing fuel removal in 1986.

While we believe that adequate protection of public health and safety is currently being maintained, the Commission is concerned about the slow pace of the cleanup, primarily because of the increasing potential for unforeseen problems arising. The Commission believes it may be time for the Congress and the executive branch to consider new approaches. I personally believe that an approach similar to that used at the West Valley site should be considered.

CONSOLIDATION

Let me turn next to the matter of consolidation of NRC. One vexing problem for the Commission is conducting business from 11 widely separated locations in Washington, Rockville, Silver Spring, and Bethesda. Because of facility inadequacies and high maintenance costs, we have been asked by the General Services Administration to move the Commisioners' and staff offices out of the Matomic Building in downtown Washington when the lease runs out next year. Some other buildings we now occupy in suburban Maryland have similar problems, and GSA staff has indicated that it will be looking for alternatives to our current configuration, particularly for two buildings whose leases expire in 1986. However, GSA has not told us where we could relocate and how such relocations could help fulfill our need to consolidate. We urgently need to consolidate, but we have no building in which to do so.

The subcommittee's continued support is urgently needed to get this matter resolved as soon as possible. We may also need your help later if interests are brought to bear that could delay or prevent consolidation.

This completes my oral presentation, Mr. Chairman. At this time we would be pleased to answer any questions you may have.

RESTRICTION ON HIGHLY ENRICHED FUEL AT UNIVERSITIES

Chairman HATFIELD. Thank you very much, Mr. Palladino.

Would you describe the Commission's efforts that I understand are underway to restrict the use of highly enriched uranium fuel in university research reactors?

Mr. PALLADINO. Mr. Chairman, we have been addressing this question of getting highly enriched uranium out of university reactors and have prepared a policy statement on this matter.

The major difficulties are with two universities that have special requirements. And while we would like to see them proceed also in going to low enriched uranium, provisions are included whereby special problems could be considered.

Chairman HATFIELD. Is there a potential danger posed by the use of highly enriched uranium?

Mr. PALLADINO. There are two problems that we see in the use of highly enriched uranium for university reactors particularly, and general usage by research reactors: One is the question that existence of highly enriched uranium in these locations does increase the possibility of sabotage and would require additional safeguards. The other has to do with setting an example for the rest of the world that we should not be trafficking in highly enriched uranium when it is not necessary from a nonproliferation standpoint. The material in the form that is used could be potentially used for nuclear weapons if it got in the wrong hands.

Chairman HATFIELD. Is lower enriched uranium technically feasible?

Mr. PALLADINO. It is in most reactors. There are some reactors that have high fluxes where the development of special fuels needs to be completed before conversion could be made.

Chairman HATFIELD. How many university reactors are affected in this?

Mr. PALLADINO. Commissioner Gilinsky said 24.

Chairman HATFIELD. Would you supply that for the record?

Mr. PALLADINO. You would like a list for the record? We will provide that.

[The information follows:]

UNIVERSITY REACTORS USING HEU FUEL

		Type of Reactor	Power Level	Authorized Amount U_{235} (kg.)	Estimated Available Date for LEU Fuel	License Exp.
1.	Oregon State University	TRIGA	1 MW	16.3	1985	2006
2.	Washington State University	TRIGA	1 MW	19.9	1985	2002
3.	Texas A. & M. University	TRIGA	1 MW	17.2	1985	2003
4.	University of Wisconsin	TRIGA	1 MW	13.65	1985	2000
5.	Virginia Polytechnic Institute	Argonaut	100 kW	8	1985	Under review
6.	University of California (L.A.)	Argonaut	100 kW	5	1984	Exp. 1980 hearings
7.	University of Michigan	MTR	2 MW	16.11	Being converted	1985
8.	University of Lowell	MTR	1 MW	4.8	Now	1985
9.	University of California (S.B.)	Homogeneous	10 W	1.35	Now	1994
10.	University of Missouri (Rolla)	MTR	200 kW	4.3	1986	Pending to 2003
11.	Ohio State University	MTR	10 kW	4.6	Now	
12.	Renssalaer Polytechnic Institute	Critical facility	100 W	4.99	May require redesign	2003

13.	Iowa State University	Argonaut	10 kW	4.6	1985	Pending to 2003
14.	University of Washington	Argonaut	100 kW	7.5	1984	1989
15.	University of Florida	Argonaut	100 kW	4.82	1984	2002
16.	Worcester Polytechnic University	MTR	10 kW	4	Now	2002
17.	University of Virginia (UVAR)	MTR	2 MW	17.6	1986	2002
18.	Purdue University	MTR	1 kW	3	Now	1986
19.	Georgia Institute of Technology	MTR	5 MW	13.5	1986	1994
20.	Manhattan College	Critical facility	.1 W	3.2	May require redesign	Renewal to 2003
21.	University of Kansas	MTR	1 kW	4	1989	Renewal to 2003
22.	University of Missouri (Columbia)	ATR	10 MW	45	Technology not yet available	2001
23.	M.I.T.	MTR	5 MW	29	Technology not yet available	1996
24.	University of Virginia (Cavalier)	Cavalier	100 W	17.6	1986	?
25.	Rhode Island	-	2 MW	10.4	Now	

* Material taken from LEU Study Group Report of November 15, 1983

Chairman HATFIELD. All 24 of those reactors would be affected in the question I just posed relating to the lower enriched uranium fuel?

Mr. PALLADINO. They would be affected in different ways, I think, by and large, most of them. For most of them the technology is such that they could make a conversion. There are at least two and perhaps another one or two research reactors that would require special consideration, special fuel.

Chairman HATFIELD. Commissioner Gilinsky, I believe that you indicated that total nonfuel costs are estimated at around $6 million for several years. How much would you need in fiscal year 1985 to initiate this fuel conversion effort?

Mr. GILINSKY. I would recommend that the program be started with approximately $1.5 million in the first year. These cost estimates are the estimates of a committee of university people that has looked into the question for NRC. My feeling is they are probably on the high side and the full amount may not be necessary, but it will be something of that order.

Chairman HATFIELD. Do you have a high priority on this kind of program?

Mr. GILINSKY. Do we now? I would say we are just getting into it. I would like to see the priority increased.

Chairman HATFIELD. What would be the total cost, to the best of your knowledge, including costs as far as conversion?

Mr. GILINSKY. The estimate that was given to us was approximately $15 million for converting all of the reactors, and this would include the fuel cost. Some of the cost could be spread over several years. The fuel is supplied by the Department of Energy. That isn't the cost the univerities pay, although there is a cost involved.

Mr. PALLADINO. I think there still remains a question as to whether DOE would be prepared to fund a new fuel, but I think that is not a problem that can't be overcome.

Mr. ASSELSTINE. I wish to comment. At the same time, the fuel supply is an essential element of the program. The way we are formulating our rule depends upon there being the necessary funding through DOE to deal with the cost of developing and then supplying the new low enriched fuel for the reactors. That really is essential in the performance of this effort.

Mr. PALLADINO. I should add with regard to conversion and the question of using high enriched uranium in university reactors, I think for the short term our big problem is providing adequate safeguards for those reactors that now are using high enriched uranium and I think the conversion is a longer term activity, but one that we should expedite if at all possible.

Mr. BERNTHAL. Mr. Chairman, if I could add my comment and opinion here. It is very clear that it is a desirable objective, I think, to carry out these conversions. The limiting factor right now—and everyone understands this point—is available funds. It is very difficult for most of the universities and other research establishments to come up with the money, and the amount of dollars required is not so great, in fact.

Chairman HATFIELD. Dr. Bernthal, I believe this is your first appearance before our committee.

Mr. BERNTHAL. That is right.

Chairman HATFIELD. As I recall, you joined the NRC this summer. That was well before the Clinch River Breeder Reactor vote in the Senate, wasn't it? [Laughter.]

Mr. BERNTHAL. Yes, sir.

Chairman HATFIELD. As I recall, you always did a very diligent, thorough job during your tenure in the Senate as assistant to the Majority Leader, Senator Baker. Our loss, and I suppose I could add Oakridge Laboratory's loss, is NRC's gain. [Laughter.]

CRBR LICENSING ACTIVITIES

May I pose to you the question of what the status is down there in Tennessee of the permitting and licensing activities for CRBR? It seems like no matter how many times we hit that in the head it still has life.

Mr. BERNTHAL. I don't know the status very well down there anymore, Mr. Chairman. My understanding is that we received a memorandum recently from the NRC staff indicating that we were about to wind up the licensing activities with respect to the Clinch River project.

Mr. ASSELSTINE. Mr. Chairman, one remaining aspect that still is underway is what needs to be done to redress the site. That is one element that is still underway.

Mr. BERNTHAL. There is a large hole remaining in the ground down in Tennessee on the banks of the Clinch River.

Chairman HATFIELD. How much is included in fiscal year 1985 budget for CRBR activities in terms of FTE's and funding?

Mr. PALLADINO. In 1985 we are planning, essentially, no activity directly on Clinch River Breeder Reactor.

Chairman HATFIELD. And fiscal year 1984?

Mr. PALLADINO. In fiscal year 1984 we have people working on terminating various activities—and perhaps I should ask the EDO for specific numbers, if you would like to have specific numbers. Mr. Denton will answer.

Mr. DENTON. Senator, we terminated our review activities regarding Clinch River. We proposed to abolish the program as established. The review is boxed up in the warehouse, and we are placing the people involved in other high-priority safety matters. The only issue before the staff is whatever is required to address the site redress issue and there is no other technical review or research that might be spent.

Chairman HATFIELD. Could you give us a breakdown on the record what you are planning in fiscal year 1985 as far as the staff that had been assigned to this activity, and what is happening to that reassignment of staff?

Mr. DENTON. Yes, sir.

Chairman HATFIELD. Thank you.

Mr. PALLADINO. You want that provided for the record, Mr. Chairman?

Chairman HATFIELD. Yes, at your earliest convenience for the record.

[The information follows:]

No resources are included in fiscal year 1985 for the Clinch River Breeder Reactor Program Office (CRBRPO). The current estimated use of the remaining CRBRPO resources in fiscal year 1984 is in the area of safety technology, including advanced reactors, unresolved safety issues, generic safety issues, and human factor issues.

PREPARED STATEMENT OF COMMISSIONER GILINSKY

Chairman HATFIELD. I think I should also point out that this is Commissioner Gilinsky's last appearance before the subcommittee—his term will end shortly. Your service to the Commission and Council and to this committee is much appreciated.

I understand you have submitted a prepared statement for inclusion in the record. Without objection, it will be incorporated at this point.

[The statement follows:]

STATEMENT OF COMMISSIONER VICTOR GILINSKY

Mr. Chairman, Members of the Committee:

As this will be my last appearance before the Committee, I would like to go beyond the current budget to say a few words about areas at NRC where improvement is needed.

SHIFTING THE FOCUS OF REGULATION

The most important issue before us is how to shift the focus of the agency toward nuclear operations. For the foreseeable future, the agency will be dealing almost entirely with reactors that are operating or being readied for operation.

I am convinced that this requires more funds for inspection. Nuclear safety depends more than anything else on operational discipline in doing the basic things well, twenty-four hours a day. NRC's inspectors enforce a common discipline, which is especially important in view of the large number of nuclear utilities -- there are about 60 in all. Yet our budget for inspectors is still only about one-third of our research budget. This doesn't make sense from the point of view of safety. If a choice has to be made between the two, there isn't any question in my mind that safety would be better served by shifting funds from research to inspections.

There are other problems in shifting the agency's focus. The NRC lacks the industrial experience which is necessary for effective regulation of operating reactors. Few staff members have such experience. So far as I can tell, none of the two dozen or so top officials, or the Commissioners, have it, either. This is a serious deficiency in an agency charged with oversight of operator qualifications, plant operating procedures, maintenance, and other essentials that determine safety day in and day out.

For example, had the NRC been more alert to what constitutes good power plant operation, we would not now be facing decisions on the licensing of new plants which do not have a single operator on their staff with prior commercial operating experience. The operators are the most important factor in the safety equation. During normal operations, the senior operators authorize maintenance, repairs, and testing. In an accident, they decide whether automatic safety systems should be disabled or overridden. The significance of this should be apparent from our experience at Three Mile Island. It is hard to think of a more worrisome state of affairs than the absence of experience on a plant's operating staff.

Need Better System for Spotting Problems

Despite some changes after TMI, the NRC still does not have a good early warning system for spotting safety problems, or for learning the lessons of accidents and near-accidents. The staff office created to carry out this function has too little independence and too little clout. My experience with problems at both operating plants and those under construction has been that the NRC has not been effective at evaluating its own performance. For example, even though it was clear that the failure of the automatic shutdown system a year ago at the Salem plant had not been properly handled by the NRC, there was no real evaluation of this, and there were no significant recommendations for improvement at NRC. I sense an increasing tendency to be defensive about the agency's shortcomings.

It is a fact of regulatory life that those who license an activity are generally not the best ones to assess dispassionately a failure of the system. In air transportation, where the FAA is in charge of licensing, this problem has been dealt with by giving responsibility for investigating accidents to the National Transportation Safety Board. To correct the analogous problem at NRC, I would create an independent Safety Board to investigate mishaps, assign probable cause and make recommendations for improvements, both at power plants and at the NRC. The Commission should, in any case, devote more of its time to understanding the causes of safety problems.

Instead, a great deal of Commission time has been spent on matters peripheral to its safety responsibilities but which are politically fashionable. I put in this category the agency's "licensing reform" effort, which was intended to smooth the way for future reactors. The resulting legislative proposal hardly justifies the effort expended on it.

Another example of NRC bending with the wind too easily is the agency's response to the "licensing crunch" of three years ago, when it was told in effect that it was expected to license 33 reactors in two years. The agency was turned inside out to avoid licensing delays projected on the basis of utility schedules. As it turned out, the projected delays were a mirage. The utility schedules were completely unrealistic and only 7 of the plants were completed and ready to be licensed in that time. However pleased we may be that the NRC completed its part of the licensing work for these plants well ahead of time, we should recognize the price we paid in terms of safety work not done elsewhere.

SIMPLIFYING THE HEARING PROCESS

Something needs to be done about the overly legalistic nature of the hearing process. Most of the proposals for changes made so far have failed to meet the basic test of fairness and I have opposed them. But I am convinced that change is needed.

The overly legalistic cast of the hearings originated in the Atomic Energy Commission's modeling of its administrative proceedings on court procedures. This was thought to be a useful gesture in view of that Commission's obvious bias in favor of promoting nuclear power.

Since then, a succession of Commissions have found in the Licensing Board hearings, and the surrounding judicial trappings, a ready excuse for not involving themselves in individual proceedings and not taking responsibility for safety decisions. The creation of the Appeal Board to handle appeals from Licensing Board decisions enabled the Commission to further distance itself from the hearings. This remoteness of the Commission from the nitty-gritty of the agency's main work has been the source of many of the NRC's problems.

There is no single cure for these ills. There are, however, a few measures which could readily be taken to make the NRC system more effective.

Get NRC Staff Out of Hearings as a Party

The first of these is to get the NRC staff out of the hearings as a party. The current role not only involves a tremendous waste of the staff's time but is inconsistent with its health and safety responsibilities -- both in appearance and in reality. The staff habitually lines up with the utility to argue for a license. Not surprisingly, this makes the public suspicious. The TMI case is the perfect example of that. Inevitably, the staff role as advocate in hearings also affects its substantive decisionmaking. It would be surprising if it did not.

To understand the present arrangement, you have to know that the Commission, over the years, has viewed the staff, and not the Boards, as its real representative in the hearings. The staff has shared this view: one of the chief staff lawyers once told me that the Commission had to rely on the staff to make sure the plants were licensed because they could not count on the Boards to do so. That isn't the way the system is supposed to work.

The Byron case, in which the Licensing Board recently denied an application for an operating license, demonstrates the problems which exist. There, it is quite clear that the staff, which was seeking approval of the license, tried to circumvent the Licensing Board's review of the plant's quality assurance program and failed to inform the Board or the Commission promptly of some of the problems at the plant. The NRC staff's comment on this is revealing: "...It has not been the Commission's practice in recent years to seek or to obtain from the staff reports on the substantive details of the staff's review of particular operating license applications."

After the Board's denial of the license, the NRC staff and the plant's owners met to discuss how best to extract the license from the Boards. Again, the Commission was out of the picture. While the NRC staff argues that its discussions with the Byron owners were about the "underlying technical issues", it is clear that the object of the meeting was to determine how to reverse the setback suffered before the Licensing Board. Nor is that prohibited by our current rules.

These situations arise because the Commission and the staff are barred from communicating privately with each other when the staff is a party in a hearing. As a result, the Commission is sometimes not even aware of the agency's major actions. If the staff ceased to be a full party, these barriers to information could be eliminated.

The NRC staff's participation in hearings also has a budgetary aspect. I have been told by NRC resident inspectors at sites involved in hearings that they spend as much as half of their time on the hearing. Much, if not most, of this time is attributable to the fact that the NRC staff is a party. There is no reason for the NRC to spend its limited resources duplicating hearing work that can, and should be, done by the utilities. This would also enable us to reduce the number of lawyers at the NRC.

Abolish the Appeal Board

Making the Commission directly responsible for appeals from Licensing Board decisions by eliminating the Appeal Board would both tighten decisionmaking and reduce the excessive legalism which that Board has promoted in the conduct of hearings. While the Commission would, of course, have to rely on the support of a hearing office, perhaps under the General Counsel, the Commission would still be far more intimately involved in the decisions than it is now. And it wouldn't hurt if Commissioners occasionally wrote their own decisions.

The objection is often made that the Commission could not possibly duplicate the Appeal Board's role in reviewing every single case. I see no need for that.

Keep Commission in Approval Process for Operating Licenses

Since the TMI accident the Commissioners have themselves been passing on all operating license approvals before they go into effect. These Commission reviews, brief as they are, have led to some very significant improvements in plant hardware and operations, not to speak of the fact that they have been very informative for the Commission. There are, however, pressures to relinquish this function -- to return to the old way of doing things -- and there is some support for this on the Commission. I urge you not to let this happen.

STRUCTURE OF THE COMMISSION

My last point deals with the Commission's decline as a decisionmaking body. The interaction between the Commissioners has dwindled over the past several years. There is little interchange of ideas or collaborative decisionmaking. The Commission has difficulty in focusing on the important questions. The Commission seldom gives clear guidance to the staff at the close of meetings; unwelcome guidance is often ignored with impunity. Respect for the Commission has declined and, by default, power has shifted to the staff.

A couple of years ago, the Commission agreed to try to focus its activities and enhance its efficiency by giving each Commissioner lead responsibility for an area of the agency's business. The particular areas each Commissioner would handle were agreed to by all. But then, for reasons that remain unclear, the matter was quietly dropped. It should be revived.

The Reorganization after the Three Mile Island accident was intended to clarify the roles of the Chairman and Commissioners. It has only succeeded in confusing things further, and in creating new problems. For example, the difficulty in holding top agency managers accountable is very much increased by the Chairman's having been made their direct supervisor by the Reorganization Plan; criticism of the managers' actions is now viewed as criticism of the Chairman.

Staff accountability has been further undermined by the new practice of having only the Executive Director's name appear on all documents submitted to the Commission, including technical and scientific ones. He is not held accountable because he is not expected to know the technical material, and the technical experts are not held responsible because they no longer sign the papers. The practical effect is to put more distance between the Commission and responsible staff offices.

Thus the unfortunate result of the Reorganization is that the Commission is now more removed from the staff and is less well informed than ever before. The staff demonstrates a certain disdain for the Commission in deciding what to tell it. Sometimes they tell us what is going on and sometimes they don't. For example, last December, the staff issued low power licenses to LaSalle Unit 2 and WNP-2 without prior notification to the Commission.

Staff Needs New Blood

The NRC's difficulty in adapting to new situations is aggravated by the fact that virtually all the top officials have been with the NRC since its formation. Indeed, almost all of them grew up in the NRC's predecessor, the Atomic Energy Commission. This results in a certain amount of stagnation and unreceptiveness to new ideas. For example, despite the obvious need, the agency has been slow to recruit persons with commercial operating experience.

The Senior Executive Service reform, which was intended to introduce some vigor and flexibility at the top personnel levels, has served only to reinforce the status quo. In practice, the bonus system is used to reward conformity. It is worth pointing out that SES bonuses are handed out by an NRC staff board of 15 officials, who award themselves roughly 40 percent of the bonus money available for the 200 SES staff. At the very least, I would have the Commissioners pass on bonuses for the 15 board members and the top staff.

It cannot be said too strongly that these personnel matters are not merely housekeeping details. The NRC staff organization plays a far larger role in the agency's decisionmaking than do the staffs at other regulatory bodies. Control of the NRC staff is tantamount to control over the agency's decisions.

I want to emphasize that the working level NRC staff members are as good and competent a group as you will find anywhere. We just need to find better ways to guide their efforts.

A Three-Member Commission

Ultimately, the Commission's performance depends a great deal more on the quality of the individual Commissioners than it does on the details of organization. Still, a five-member Commission may be too unwieldy for an agency with operational responsibilities. I would recommend a smaller Commission of three members, with each Commissioner having lead responsibility for an area of the agency's activities. This would help focus responsibility while retaining the advantages of a Commission -- independence and greater balance. My own experience is that the Commission functioned much more effectively when there were only three Commissioners (either because seats were unfilled or because of disqualifications on particular issues). The Tennessee Valley Authority, which has major operational responsibilities, is run by such a three-person board.

In conclusion, I would like to say that I have appreciated the opportunity to appear before this Committee.

ADDITIONAL PREPARED QUESTIONS SUBMITTED FOR THE RECORD

Chairman HATFIELD. Now, I am going to submit the remaining questions to you for your response for the record. I will excuse you and ask for the principal witness, Raymond J. O'Connor, the Chairman of FERC, to come.

Mr. PALLADINO. Thank you, Mr. Chairman, we will provide answers to your questions.

[The questions and answers follow:]

THREE MILE ISLAND

Question. Please give us an update on the TMI-2 reactor cleanup. What progress has been made in the last year?

Answer. During calendar year 1983, progress in the cleanup was somewhat limited, in part due to funding constraints and of the need to delay some work until allegations by several licensee and contractor employees about administrative deficiencies in the cleanup were investigated. More recently, however, some significant accomplishments have been made as the licensee focuses cleanup efforts toward the defueling of the damaged core. During the past year, the major accomplishments include the following:

—The waste water in the reactor coolant system (90,000 gallons) has been processed on a periodic basis to limit the buildup of radioactivity leaking from the damaged core.

—Approximately 70 percent of the contaminated areas in the auxiliary building has been decontaminated, but the most contaminated cubicles were bypassed.

—Offsite shipments of high specific activity abnormal waste include 50 EPICOR-II prefilters and 15 submerged demineralizer system (SDS) zeolite liners.

—Several visual inspections of the damaged core at three different locations have been conducted to determine the nature and extent of the damage and aid in defueling planning.

—The reactor building polar crane has been refurbished and load tested and is qualified for lifts up to 170 tons. The polar crane is necessary to lift the reactor vessel head (approximately 163 tons) and plenum (approximately 55 tons).

—As an aid to planning for reactor vessel head lift, measurements of the radiological conditions underneath the head were taken and yielded values ranging from 300 to 700 R/hr with the water level lowered to simulate conditions of a dry head lift. For head lift, shielding will be applied, where appropriate, to minimize the radiation levels in areas occupied by workers.

—Three dimensional sonar mapping of the core void (i.e., damage) has been done.

—Washdowns of contaminated walls, floors, and equipment surfaces in the reactor building have been ongoing in an effort to remove loose or smearable contamination and ultimately lower reactor building atmosphere particulate activity levels.

—The licensee launched a multiphase dose reduction program in late 1982. This program includes the shielding of known sources of exposure such as floor drains, hatches, penetrations, the enclosed stairwell, and the elevator shaft. These efforts have resulted in some significant reductions in dose rates in the general areas of the 305-foot and 347-foot elevations.

—The reactor vessel studs and associated nuts which bolt the reactor vessel head to the vessel flange have been partially detensioned as the first step in the head removal process.

—The licensee has obtained six samples from the core debris bed and the samples have been partially analyzed for their physical and radiological characteristics.

As described above, some significant progress has been made in the cleanup and some important milestones have been reached. However, the most complex and difficult work lies ahead as the licensee focuses his efforts on defueling the reactor and placing the plant in a safer condition. The work that remains includes the following:

—The reactor vessel studs will be fully detensioned in preparation for head lift.

—The planned dry reactor vessel head lift is scheduled for August of this year.

—Decontamination of the containment will continue in an effort to reduce particulate activity levels in the reactor building atmosphere.

—Continuing dose reduction measures will be employed to lower worker exposure within the containment.

—Plenum inspection and subsequent removal will be performed following reactor vessel head lift. Destructive removal of the plenum may be required if the plenum is stuck in place. If the plenum can be removed in one piece, this activity should occur during 1985. If destructive removal is required, the schedule for completion is uncertain.

—Fuel removal will begin after plenum removal and should be initiated in 1986. This activity may take a year and a half to complete, depending upon the difficulties encountered during the defueling effort.

—The decontamination and subsequent removal of the tanks located in the A fuel pool need to be completed to support the defueling effort.

—Efforts to carry out the removal and subsequent shipment of the highly radioactive purification demineralizer resins are ongoing.

—Packaging and shipment of fuel and other abnormal waste generated in support of defueling activities will begin after the onset of fuel and fuel debris removal from the reactor systems.

—Planning for future decontamination efforts in the auxiliary building is ongoing.

—Surface decontamination and internal piping system flushes in the auxiliary building will be performed. This could be done over a period of several years.

—Surface decontamination in the reactor building, including the possible scarification of badly contaminated concrete surfaces, might require several years of continuous effort.

—Decontamination of the corrosion layer of the piping constituting the reactor coolant system pressure boundary will not begin until the defueling of the reactor vessel and associated piping is complete.

—Processed accident water will be utilized for decontamination activities and to support the defueling effort, but will require disposition in the latter stages of cleanup.

Since the required funds for completion of the cleanup are not fully committed, any schedular estimates given above are uncertain.

Question. As I recall, you indicated last year that a utility and contractor management shakeup was expected to improve the cleanup operations. Have improvements occurred?

Answer. In August 1982, the NRC staff approved the licensee's proposed organization which integrated the primary cleanup contractor (Bechtel) into the licensee's organizational structure. Prior to August 1982, there were two separate organizational entities (the licensee and Bechtel) involved in TMI-2 cleanup activities, and, in the Commission's view, the complex relationship between the two organizations was, in part, responsible for identified administrative deficiencies (NRC Office of Investigations report dated September 1, 1983) in TMI-2 cleanup activities. There have been some notable improvements in cleanup activities since the August 1982 reorganization as evidenced by a successful reactor building dose reduction effort, initiated in the fall of 1982, the successful shipment of abnormal solid waste, the recent completion of the reactor building polar crane load test, and partial detensioning of the reactor pressure vessel studs and nuts which bolt the head to the vessel flange. These activities have been carried out safely and effectively and are indicative of an improved organization. The licensee is currently making preparations for reactor pressure vessel head lift in August of this year as efforts are focused toward defueling to place the plant in a safer configuration. The Commission is confident that, given adequate funding, a safe cleanup can be effected.

Question. What are the potential health and safety dangers due to the rather slow pace of the cleanup?

Answer. Even though TMI-2 is presently in a safe shutdown condition and public health, safety, and the environment are being adequately protected, this situation is not certain to remain stable indefinitely. The TMI-2 reactor and related facilities are presently in a condition for which they were not designed. Although some progress has been made in the cleanup, the damaged core has not been removed and packaged in a safe configuration and uncertainties about long-term plant stability persist. A slowdown or halt in cleanup activities would only increase the risks related to the plant in its present condition.

If TMI-2 is allowed to remain in its present condition over the long term, accidents involving radiation leakage and subsequent exposure to workers and the public have a greater probability for occurrence. The potential for these adverse events, although small now, will increase with time as TMI-2 equipment deteriorates. Such deterioration will be the inevitable result of maintenance limitations in areas of the TMI-2 facility where high radiation fields persist. Since the radioactive fission products and the damaged fuel presently contained in the reactor and the containment building will remain radioactive for an extremely long time, potential leakage of radioactive materials to the environment will continue to pose a threat until the fuel is removed, the facilities are decontaminated, and all radioactive wastes are disposed of safely.

In combination with mechanical deterioration over time, natural phenomena (e.g., unexpectedly severe weather) and other adverse scenarios (e.g., fire) pose a potential threat to continued successful containment of TMI-2 contamination and stored waste. Although the likelihood of severe weather or a fire resulting in a radiation release to the environment is small, the possibility does exist, and the likelihood for such events occurring increases over time. Only the completion of all cleanup and radioactive waste disposal activities at the TMI-2 site will eliminate all possibility of inadvertent radioactive releases.

Question. What obstacles remain to the restart of TMI-1?

Answer. On January 27, 1984, the Commission announced its desire to make a decision on TMI-1 restart in June 1984. Before such a decision is made, an evaluation of pertinent ongoing investigations regarding management integrity will be completed. In its January 27 notice, the Commission stated its tentative view that only the unit 1 leak rate investigation would require further resolution before a decision on management issues. That investigation is scheduled to be completed by April. Also remaining to be reviewed before a decision are the parties' comments on the list of integrity issues and the NRC staff's response to the GPU proposal. In addition, the Commission must make a decision on the question of whether or not the license amendment concerning the repair of the steam generators presents a significant hazards consideration. Lastly, the Commission will complete an evaluation of the adequacy of hardware issues in the TMI-1 restart proceeding.

CLINCH RIVER BREEDER REACTOR

Question. What is the status of permitting and licensing activities for CRBR?

Answer. Essentially all CRBR permitting and licensing activities have been terminated. No construction permit is currently planned. However, a small amount of work remains on CRBR associated with site redress. When the Commission granted the Department of Energy an exemption allowing site preparation activities to begin in advance of the construction permit, it also required DOE to commit to redress the site if a construction permit was not issued. Accordingly, the DOE's plan for site redress was submitted to the Commission for approval on March 5, 1984. The staff's review of this plan is in progress and should be completed in the near future. The Atomic Safety and Licensing Board intends to conduct a hearing on site redress as part of the construction permit proceeding when the staff review is complete. After approval of a site redress plan for CRBR, there will be a small followup inspection effort by NRC to verify implementation and compliance with the plan. All other reviews and work associated with CRBR licensing activities have been terminated.

Question. How much is included in the fiscal year 1984 and the fiscal year 1985 budgets for CRBR activities in terms of FTE's and fundings? Also, what are your plans in fiscal year 1985 for the staff which was assigned to CRBR activities?

Answer. The NRC offices involved with the CRBR construction permit review activities have taken action to phase down CRBR-related work, as appropriate, and to redirect the available resources to other priority programs.

The Office of Nuclear Reactor Regulation has prepared a termination report sumarizing the staff's review progress since the issuance of the SER and is closing out all technical assistance projects. NRR staff will be required to review and approve the site redress plan and some effort may be needed to respond to additional ASLBP questions or intervenor requests. Of the 18 FTE's and $1.1 million planned for the fiscal year 1984 CRBR license review activities, NRR will redirect the remaining resources, about 13 FTE's and $1.1 million to its safety technology programs.

The Office of Inspection and Enforcement has redirected resources planned for fiscal year 1984 CRBR-related inspections—three FTE's in region II to the radiological assessment safety program and $0.3 million to other priority inspection programs. Some minimal effort by region II may be required for inspection of the applicant's site redress.

The Offices of Nuclear Regulatory Research (RES) and Nuclear Reactor Regulation (NRR) have conducted a thorough review of the research program planned for liquid metal fast breeder reactor (LMFBR) activities which amounted to $7.3 million for fiscal year 1984. RES has redirected $2.0 million from fiscal year 1984 CRBR-related activities to fund severe fuel damage research and $0.3 million has been transferred to NRR for continued containment integrity work in support of NRC's reassessment of radioactive source terms. The remaining $5.0 million in fiscal year 1984 will provide for an orderly closeout of all contracts directly supporting the CRBR license review activities and for a transition to a reduced LMFBR program.

The fiscal year 1985 budget request includes $3.5 million for an LMFBR program to maintain a cadre of technical experts with the necessary specialized skills to allow the continued participation in existing foreign agreements. This will permit the NRC to stay abreast of the latest technology by using available foreign experimental results to assess and update NRC-developed LMFBR analytical methods.

Question. Briefly describe the proposed licensing reform legislation the Commission has submitted to Congress.

Answer. A section-by-section analysis of the legislation is attached. Additional views of Commissioners Roberts and Asselstine are also attached.

Attachment 1

SECTION-BY-SECTION ANALYSIS

Section 2. Findings and Purposes

This section supplements sections 1, 2 and 3 of the Atomic Energy Act which set forth the declaration, findings and purpose of the Act. This section highlights the major provisions of this bill which are being enacted for the general purpose of improving the quality, effectiveness, and efficiency of the licensing process for siting, construction and operation of nuclear facilities.

Section 101. Construction Permits and Operating Licenses.

This amends section 185 of the Atomic Energy Act, a section which establishes the procedures to be followed by the Commission in authorizing construction permits and operating licenses for nuclear facilities.

Subsection a. of section 185 as it would be amended authorizes the Commission to grant a construction permit for a production or utilization facility and, upon the completion of construction to grant an operating license. This subsection restates existing authority with one exception. This legislation would delete the requirement for specification of the earliest and latest completion dates for construction permits. The existing provision has produced unnecessary paperwork and expenditure of resources without assuring that construction is diligently pursued. Moreover, the provision in current section 185 for earliest and latest completion dates made sense when it was included in the Act in 1954 because the Federal Government would be owning the fuel and would need to allocate special nuclear material between the civilian nuclear power and defense programs. It was important for AEC to predict completion dates (and hence operation commencement dates) with accuracy so that civilian requirements for special nuclear material could be predicted accurately and planned for properly. The Federal Government no longer allocates fuel and has a much lesser need to predict completion dates accurately. Thus, the provision is no longer needed to serve the purpose for which it was adopted.

Although the requirement for the specification of the earliest and latest construction completion dates is deleted, the Commission will still issue a construction permit or a combined construction permit/operating license for a fixed period not to exceed forty years pursuant to sections 103(c) and 183 of this Act. The legislation would also provide specifically for an opportunity for a public hearing. This is consistent with section 189 as it is proposed to be amended by section 102 of the bill to delete the current requirement that hearings be held on construction permits for certain large facilities even in the absence of a hearing request.

In addition, consistent with present regulatory practice, an application to modify a production or utilization facility will require a construction permit only if the modification is defined as a material alteration of that facility pursuant to 10 CFR § 50.91.

Subsection b. of section 185 as it would be amended permits issuance of what would be called a combined construction permit and operating license (CP/OL) for a thermal neutron power generation facility. This definition would include all currently licensed U.S. commercial nuclear power reactors (including all currently licensed U.S. gas-cooled reactors), but exclude facilities such as breeder reactors and fuel reprocessing plants. A combined CP/OL could be issued for thermal neutron power generation facilities only if the application contains sufficient information to support the issuance of both the construction permit and operating license. In short, the application must include an essentially complete design. After issuance of the CP/OL and prior to commencement of operation (fuel loading), the Commission must find that the facility has been constructed and will operate in conformity with the CP/OL, the requirements of the Commission implementing this Act, and the National Environmental Policy Act of 1969 (NEPA). An opportunity for public hearing will be provided prior to the issuance of the CP/OL and prior to the commencement of operation as prescribed in section 189 of this Act. In addition, prior to commencement of operation the Commission will conduct a supplemental review of any safety and environmental issues that are required to be considered and were not considered in any prior review of that facility, facility site, or design approval for that facility. The preoperational review would be documented and result in the issuance of an operation authorization that would be considered a license for purposes of post-operational inspection and enforcement, for purposes of fixing the period of the operating license pursuant to sections 103(c) and 183 of this Act, and for purposes of judicial review under section 189e.

Subsection c. of section 185 as it would be amended authorizes the Commission to rely upon a certification of need for the facility and the results of the consideration regarding alternative sources of generating capacity that are made by competent Federal, state or regional governmental entities upon an appropriate verification by the certifying organization. This subsection has been added to eliminate a duplicate review by the Commission of these environmental findings which are needed to support licensing decisions under applicable provisions of Federal law, and which have been made by other appropriate governmental organizations. If a proper certification is made, it shall be conclusive for determining compliance with applicable Federal law, and the findings shall not be reviewable in a Commission proceeding or in Federal Court involving its review of a Commission decision. The bill would not affect judicial review of a Federal agency's certification pursuant to laws other than the Atomic Energy Act; however, no additional rights to judicial review of Federal agency certifications are intended to be created.

Determinations regarding alternative energy sources made by governmental organizations cannot preempt the Commission's regulatory authority over radiological hazards. Accordingly, a state could not substitute its judgment for that of the Commission regarding the radiological hazards of a nuclear facility in determining a preference for energy options. The Commission will develop and provide to the states its assessment of the radiological hazards of the nuclear alternative which could then be used by the states in their respective considerations of energy alternatives.

Subsection d. has been added to ensure that the Commission shall not commence a proceeding to modify a final determination made in any prior proceeding involving a particular facility, facility site, or design approval for that facility, unless there is a substantial reason to do so. For purposes of this subsection, a final Commission determination, for which no hearing was requested or needed, would be accorded the same weight and effect as a prior final Commission determination made after a hearing. The person or entity requesting the modification must make a substantial evidentiary showing, as defined in section 201 of the Act, in accordance with procedures to be established by the Commission that the modification is required to comply with Commission requirements relating to this Act or other pertinent Federal laws. The bill defines a substantial evidentiary showing, for purposes of this section, subsections 193f. and 194e., to be a showing of evidence by the proponent of the modification that is sufficient to justify the conclusion that the proposed modification of the previous NRC final determination is required to comply with the Atomic Energy Act of 1954, other providions of Federal law or the Commission's regulations. The bill also specifies that, in reaching its conclusion on the sufficiency of the proponent's evidentiary showing, the Commission will consider only the evidence presented by the proponent of the proposed modification as well as any reasonable inferences that can be drawn from that evidence. However, any party can present, and the Commission can consider, argument concerning the sufficiency of that evidence. For purposes of this subsection, a proponent would include the NRC staff. This requirement for a threshold evidentiary showing imposes the burden on the proponent of a proposed modification to a final Commission determination to present at the outset sufficient facts, reasoning and supporting technical analysis to demonstrate that there is a substantial basis for believing that the proposed modification is needed to comply with the Atomic Energy Act, other Federal law or the Commission's regulations. In determining the sufficiency of an evidentiary showing under this section, the Commission is not expected to conduct a detailed review of the merits of each element of the proponent's case, such as would normally occur after the submission of evidence from parties favoring and opposing a proposed modification in a Commission licensing proceeding. However, the Commission, in assessing the sufficiency of the proponent's threshold evidentiary showing, may take official notice of any fact of which a court of the United States may take judicial notice and may apply its technical judgment based upon technical or scientific facts within the knowledge of the Commission as an expert body. For purposes of this subsection, and subsections 189a.(1)(D), 193f. and 194e. the term "Commission's regulations" is intended to refer to those regulations of the Commission in effect at the time the modification is proposed. This subsection is intended to limit NRC initiated changes after a final Commission decision. It is not, however, intended to limit the ability of the NRC staff to question whether such changes should be made or to restrict staff effort in examining proposed changes.

Under current law, after a proceeding to modify a license is commenced by issuance of an order under 10 CFR 2.204, the proponent of the modification has the burden of going forward to make a *prima facie* case. The evidentiary burden imposed by this subsection and counterpart subsections 193f. and 194e. is similar, but would apply at an earlier phase before a formal order commencing a proceeding can be issued. The requirement in these subsections would not affect the Commission's or the NRC staff's authority to seek and obtain information from licensees about public health and safety problems. Indeed, it is quite possible that licensee-supplied information would be the basis for satisfaction of the evidentiary burden requirement. Subsection 185e would provide that nothing in section 185 affects state authority over radiation hazards. Thus, this Act would not create any new state authority over radiation hazards.

Section 102. Hearings and Judicial Review.

This section amends section 189 of the Atomic Energy Act of 1954. Section 189 affords members of the public the opportunity to request and participate in hearings on proposed licensing actions relating to specific nuclear facilities and activities.

The amendments to section 189 eliminate the present requirement for a mandatory hearing, even if no hearing is requested by a member of the public, for the issuance of a construction permit for commercial production and utilization facilities or testing facilities. The Commission would still be required to afford an opportunity for hearing and would hold a hearing at the request of any person whose interest may be affected. This change reflects the judgment as provided in section 2(a)(11) of the bill that adjudicatory hearings should not be held where there are no material issues of fact placed in dispute. This section also would permit the Commission at its discretion to use hybrid-type hearing procedures, as specified in subsections c. and d., instead of the formal adjudicatory procedures which have been used in the past.

Subsections 189a.(1)(A)-(C) would require that prior notice of various kinds be given and opportunity for public hearing afforded at key points in the licensing process for site approvals, design approvals, construction permits, operating licenses, combined CP/OLs and preoperational reviews for plants which have been previously issued a combined CP/OL. These provisions do not apply to materials and export licenses. They are covered by existing law.

Subsection 189a.(1)(B) requires that special notice by publication in major newspapers having national circulation be given on the receipt and prior to the granting of an application for the approval of a facility design under section 194. Members of the public throughout the nation may wish to participate in public proceedings on design approval requests and this is a special mechanism for providing them with appropriate notice. Design approvals may be applied to any appropriate facility site location throughout the country and, hence, broad public notice should be provided for the design approval request.

Subsection 189a(1)(C) requires the Commission to offer a hearing prior to operation of a facility for which a combined CP/OL has been granted. The types of issues that can be raised are specified in subsection 189(1)(D).

Subsection 189a.(1)(D) would limit hearings to matters that were not and could not have been considered and decided in prior proceedings involving that facility, facility site, or approval of a design for that facility under section 194. This subsection would preclude adjudication of a matter that had been previously litigated unless there has been a substantial evidentiary showing that the issue should be reconsidered based on significant new information which came to light after the prior proceeding. This subsection would also preclude adjudication of a matter that had not been previously litigated, but could have. However, such an issue would be acceptable if the proponent makes a substantial evidentiary showing that significant new information has been developed since the prior proceeding and therefore the facility is likely not to meet requirements. An issue which could not have been raised in a previous proceeding would be an appropriate issue for consideration in a subsequent adjudicatory hearing if it otherwise meets the requirements of this section. For the purposes of subparagraph (D), the bill defines a substantial evidentiary showing as one sufficient to justify the conclusion that the facility will no longer comply with the

Atomic Energy Act, other Federal law or the Commission's regulations (see discussion, P.6).

The provisions restricting modifications to specified final NRC decisions in revised sections 185d., 193f., and 194e. differ from the related provisions restricting relitigation of issues in revised section 189a.(1)(D). The first three are primarily intended to control the NRC's requiring modifications. The last is aimed at requiring intervenors to meet a reasonableness criterion. Both provide similar relief from the restriction if the proponent makes a defined substantial evidentiary showing in accordance with Commission procedures. However, sections 185d., 193f., and 194e. provide generally for a substantial evidentiary showing of non-compliance with regulatory requirements, while section 189a.(1)(D) provides more narrowly for a substantial evidentiary showing of non-compliance with requirements based on new information. Moreover, the first three sections listed only restrict Commission modifications of matters that have been both considered and finally decided in the prior proceeding. The section 189 provision restricts relitigating matters that either were or could have been considered and finally decided in the prior proceeding. The former provisions allow more leeway than the section 189 provisions because the former are intended for use in the formal licensing review and enforcement process. They are directed primarily at NRC staff proposed changes, although requests for enforcement action by members of the public under 10 CFR 2.206 of NRC's regulations would also be covered. Section 189a.(1)(D), on the other hand, applies only in the hearing process for agency adjudications. Here a more stringent limitation was considered appropriate in view of the fact that the hearing process is a more time consuming and expensive method of resolving disputes than the informal NRC staff review.

Subsection 189a.(2) is identical to the so-called "Sholly Amendment" language enacted by the Congress in Public Law 97-415 on January 4, 1983, except that the concept would be extended to include amendments to construction permits, CP/OLs, design approvals, and site permits.

Subsection 189b. substantially modifies the existing statute by giving the Commission discretion to use hybrid-type hearing procedures. Historically the hearing phase of the proceedings to license production and utilization facilities has been entirely on-the-record adjudicatory proceedings (*i.e.*, formal, trial-type hearings) with no flexibility to substitute informal procedures. Studies of regulatory reform in administrative proceedings have suggested in recent years the use of hybrid-type hearings as a technique to introduce permissible informality while preserving formal adjudicatory procedures for the resolution of relevant facts which are in dispute. In addition, on January 7, 1983, Congress enacted the "Nuclear Waste Policy Act of 1982," which includes a provision for hybrid hearing procedures for any hearings required on an application for reactor spent fuel storage expansion. Furthermore, the Commission has had some limited experience with hybrid hearing procedures in certain rulemaking proceedings. Thus, although hybrid hearing procedures have not been used in the licensing of nuclear power reactors and other production and utilization facilities, the format is not a novel one. Indeed its feature of using informal proceedings to identify any issues which must be adjudicated is not unlike the objectives of the prehearing procedures provided for in the Commission's Rules of Practice.

Generally, the purpose of the hybrid procedures established in subsections 189c. and d. and described below is to define with precision the issues, if any, that are in controversy and which must be resolved through formal adjudication. Discovery remains an essential part of this process, and discovery opportunities provided for in the Commission's regulations would be available to all parties.

Subsection 189c. would permit the Commission to use hybrid procedures in any hearing on an application for the granting, renewing or amending of a construction permit, operating license, combined construction permit and operating license, site permit, or approval of a design under section 194, after providing the parties to the proceeding with an opportunity to present their views. The Commission shall at the request of any party provide an opportunity for oral argument with respect to any matter which the Commission determines to be in controversy among the parties. The oral argument is to be preceded by such discovery procedures as the rules of the Commission shall provide, and each party, including the NRC staff, shall be required to submit to the Commission, in written form, at the time of the oral argument, a summary of the facts, data and arguments upon which such party proposes to rely that are at that time known to the party.

Subsection 189d. provides the procedures for determining the issues, if any, which must be adjudicated in formal proceedings. The subsection requires the Commission to designate any disputed question of fact for resolution in an adjudicatory hearing only if it determines that: there is a genuine and substantial dispute of fact which can only be resolved with sufficient accuracy by the introduction of reliable and specifically identified evidence in an adjudicatory hearing; and the decision of the Commission is likely to depend in whole or in part on the resolution of such dispute. The procedures in subsection 189d. for determining issues that must be adjudicated in formal proceedings are similar to the Commission's procedures for summary disposition in that the Commission must consider and weigh the evidence submitted by all parties on the issue to determine whether there exists a genuine dispute of material fact. However, subsection 189d. adds three requirements not found in the Commission's summary disposition procedures (10 CFR section 2.749). First, subsection 189d. requires an affirmative Commission determination as a precondition to holding a formal hearing on an issue. Under the Commission's present procedures, a formal hearing is provided unless a party requests summary disposition and the Commission finds that the requirements for summary disposition have been met. Second, subsection 189d. requires a finding by the Commission that the preponderance of the evidence submitted indicates that the genuine dispute of material fact is also substantial -- that is, that the issue is likely to be significant to the outcome of the proceeding. No such finding is required by the Commission's summary disposition procedures. Third, subsection 189d. requires a finding by the Commission that the preponderance of the evidence submitted indicates that a formal adjudicatory hearing is needed to resolve the issue. Again, no such finding is required by the Commission's summary disposition procedures. After applying the criteria in subsection 189d., the Commission must designate in writing why the ultimate decision is likely to depend on the resolution of the specific dispute and why an adjudicatory hearing is necessary to resolve the dispute. In making its decision, the Commission may take official notice of any fact of which a court of the United States may take judicial notice or of any technical or scientific fact within the knowledge of the Commission as an expert body.

Subsection 189e. maintains with only a conforming change the current provision for the judicial review of final orders of the Commission in any proceeding of the kind specified in Section 189.

Section 103. Early Site Approval.

This is a new section 193 to the Atomic Energy Act which authorizes the NRC to approve one or more sites for the location of production or utilization facilities prior to the filing of any application to construct and/or operate a facility on that site. The purpose of this provision is to permit the resolution of site-specific questions at an early stage in the licensing process. Public participation on this crucial aspect of the overall facility planning and construction process would also occur at an early point in time where such participation can be most effective. This provision is an integral part of the effort to promote the early, effective and efficient resolution of issues in the licensing process.

Subsection a. of section 193 provides that an application for early site approval may be filed by any person or entity and that the Commission is authorized to issue a site permit for a period of ten years even though no application for a construction permit or a combined CP/OL has been filed. It would also authorize limited aspects of the site (e.g. seismicity) to be considered and resolved prior to the filing of any application for a construction permit or combined CP/OL. This subsection permits an early and specific focus on the suitability of a site for production or utilization facility construction without requiring the development of a facility design. A site permit issued under this section would be a final Commission order subject to judicial review.

Subsection b. of section 193 provides that notwithstanding section 161w. of this Act or the Independent Offices Appropriation Act of 1952, no application filing or issuance fees shall be required for an application for approval or for an amendment or renewal of a site permit. The Commission is authorized to allocate the costs ordinarily defrayed by fees collected among future applicants for permits or licenses which propose to use the site permit. This provision is added as an incentive to applicants to seek approval for site permits. However, if fees cannot be defrayed because a site is not used during the initial ten year approval, the holder of the site permit must pay the full amount notwithstanding the granting of a renewal.

Subsection c. of section 193 authorizes the Commission to approve an application and issue a site permit with appropriate conditions if, after considering all the information in the application and providing an opportunity for a public hearing, the Commission determines that such approval will not be inimical to the common defense and security or to the health and safety of the public. An opportunity for a prior public hearing on the application will be afforded under Section 189 of the Act. It is currently envisioned that for full site permits the application would set forth an envelope of parameters such as: (1) the number, type or types and thermal power level of the facilities with respect to which the application for site approval is made; (2) the site description and location, including site boundaries and exclusion area; (3) description of nearby industrial, military, and transportation facilities, including usage and routes; (4) the proposed maximum levels of radiological and thermal effluents that each such facility will produce; (5) the type or types of cooling systems, intake and outflow, that may be employed by each facility; (6) the physical characteristics of the site, including seismic, meteorological, hydrologic, and geologic characteristics as well as population density and use characteristics of the surrounding area; and (7) such other information as the Commission may by rule or order require. By describing the site in such a way, the Commission could determine the site suitability for one or several generic designs that may be developed pursuant to section 194, the provision for standardized facility designs. However, nothing in this section would preclude the Commission from promulgating regulations which set forth standards and criteria for site approval consistent with section 161(i) of this Act and section 553 of title 5 of the United States Code.

Subsection d.(1) of section 193 provides that a site permit can be referenced in an application for a facility to be constructed on the site if the application has been filed within the period during which the site permit remains valid. The effect of this provision is that matters resolved in a site permit review or licensing action will not be modified or reexamined as part of the review of a construction permit or a combined CP/OL application which references the site permit, unless a substantial evidentiary showing is made pursuant to subsection f. After a site permit has been referenced, a request for renewal would be unnecessary to continue the effectiveness of the site permit for the application referencing the approved site.

Subsection d.(2) of section 193 authorizes the Commission to renew a site permit for not less than five or more than ten years from the date of renewal. Renewal would be based only upon the application of a permit holder. The minimum period of five years is set to assure that the resources used to review a renewal request are directed toward meaningful results. For example, allowing repeated renewals for only six months or a year could cumulatively tax the resources of the agency and industry alike. Moreover, it is contemplated that information necessary to form a sound basis for the decision to renew for periods of five to ten years will be readily available and within the state-of-the-art. Renewals would be based on regulations in effect at the time the renewal is requested providing a means to update the earlier approval. Subsequent renewals of the site permit will not be entertained, although the permit holder may submit a new application for the same site.

Subsection d.(2) of section 193 also sets out the criteria the Commission shall apply in deciding whether to renew a site permit. The Commission shall renew the site permit if it finds that the site will comply with this Act or NRC regulations in effect at the time of site permit renewal. Any licensing fees resulting from the granting of a renewal may be defrayed and allocated among future applicants using the renewed site permit. Defrayed renewal fees must be collected at the end of the renewal period.

Subsection e. of section 193 assures that a site approved under this section may be used for an alternative type of energy facility or any other purpose. However, the validity of the site permit for production or utilization facility siting may be affected by use of the site for a purpose not considered in its approval. The Commission intends to promulgate regulations which would require proper notice be given to the Commission regarding a nonconforming use.

Subsection f. of section 193 specifies that the Commission shall not commence a proceeding to modify any previous final determination involving a site permit unless a substantial evidentiary showing is made in accordance with procedures established by the Commission that the proposed modification is necessary to comply with Commission requirements and other applicable provisions of Federal law. This provision is intended to have the same effect as the counterpart provisions in subsection 185d. and the discussion in the section-by-section analysis of that subsection is applicable here as well.

This provision would not preclude a holder of a site permit from seeking an amendment to that permit. The Commission shall approve an amendment to a site permit issued under this section if, after providing an opportunity for hearing pursuant to section 189 of this Act, the Commission determines that the amendment will comply with this Act and the Commission's regulation. Any amendment approved would apply to any construction permit or combined CP/OL utilizing the site permit after the amendment becomes effective.

Section 104. Approval of Designs.

This is a new section 194 to the Atomic Energy Act of 1954, which provides for approval of thermal neutron power generation facility designs. As with early site approvals, this section is intended to facilitate early resolution of issues with full opportunity for participation by interested persons. Although the Commission currently has procedures for approving designs, this section gives explicit statutory support to the concept and establishes requirements for Commission approval of facility designs. This section will encourage the development and use of standardized designs, will enhance safety, and will contribute to a better utilization of NRC resources.

The facility design should be described in such a way as to provide an envelope of parameters for sites selected pursuant to section 193 to assure that the plant could be constructed on a site of given general characteristics. Typically, a facility design should be described in such a manner that it could be used at more than one site with a minimum of adaptations because of specific site characteristics. The Commission contemplates and encourages development and use of substantially complete standardized designs as an effective means of increasing agency efficiency and augmenting the public health and safety.

The application requirements for approval of a facility design will be set out in the Commission's rules. If, after Commission review of the information in the application, and after providing the opportunity for a public hearing under Section 189 of the Act, the Commission determines that the design is suitable for construction and operation, it will issue an approval and the design may be banked for future use. An approval issued under this section will be considered a final Commission order subject to judicial review. When a pre-approved design is combined with a pre-approved site, it is contemplated that there may be a hearing with respect to the relevant construction permit or CP/OL if there are outstanding issues, i.e., issues raised by the matching of the site with the design. However, issues which were or could have been decided would not trigger new opportunities for hearing at the time the site and design are matched unless a substantial evidentiary showing is made that reconsideration of site or design issues is necessary to ensure compliance with this Act, other provisions of Federal law, or the Commission's regulations.

Subsection a. of section 194 authorizes the Commission to approve facility designs or the design of any major subsystem for a period of ten years even though no application for a construction permit or combined construction permit and operating license has been filed by an applicant. This provision permits design applications and approvals to be made before initiation of construction of thermal neutron power generation facilities.

Subsection b. of section 194 provides that notwithstanding section 161w. of this Act or the Independent Offices Appropriation Act of 1952, no application filing or issuance fees shall be required for an application for approval or for an amendment or renewal of an approval of a standardized facility. The Commission is authorized to allocate the costs ordinarily defrayed by fees collected among future applicants for permits or licenses which propose to use the approved design. This provision is added as an incentive to vendors and architect-engineer firms to develop and seek approval for standardized designs. However, if fees cannot be defrayed because a design is not used during the initial ten year approval, the applicant must pay the full amount notwithstanding the granting of a renewal.

Subsection c. of section 194 authorizes the Commission to approve an application and issue a design approval with appropriate conditions if, after considering all the information in the application and providing an opportunity for a public hearing, the Commission determines that such approval will not be inimical to the common defense and security or to the health and safety of the public. The opportunity for hearing and the hearing, if held, would be in accordance with section 189 of the Act.

Subsection d.(1) of section 194 provides that a design approval can be referenced for a facility if an application has been filed within the period during which the design approval remains valid. The effect of this provision is that all matters resolved in a design approval review or licensing action, including amendments to that approval, can be transferred without a need to re-review those matters in all applications for a construction permit, combined CP/OL, or operating license which reference that design approval, unless a substantial evidentiary showing is made pursuant to subsection e. A request for renewal would not be necessary to continue the effectiveness of the design approval in these referenced applications.

Subsection d.(2) of section 194 authorizes the Commission to renew a design approval for not less than five or more than ten years from the date of renewal. Renewal would be based upon the application of a permit holder. The minimum period of five years is set to assure that the resources used to review renewal requests are directed toward meaningful results. For example, allowing renewals for only six months or a year could cumulatively tax the resources of the agency and industry alike. Moreover, it is contemplated that information necessary to form a sound basis for the decision to renew for periods of five to ten years will be readily available and well within the state-of-the-art. It also sets out the criteria the Commission shall apply in deciding whether to renew a design approval. Renewal shall be granted unless it can be demonstrated that the design will not comply with the Atomic Energy Act or the Commission's applicable regulations in existence at the time that renewal is requested. This provision allows for updating designs at the time a request for renewal of an approval is made. Subsequent renewals of the design approval will not be entertained, although the design approval holder may submit a new application for the same design. Any licensing fees resulting from the granting of a renewal may be defrayed and allocated among future applicants using the renewed design approval. Defrayed fees must be collected at the end of the renewal period.

Subsection e. of section 194 specifies that the Commission shall not commence a proceeding to modify a final determination made in a design approval proceeding unless a substantial evidentiary showing has been made in accordance with procedures to be established by the Commission. This subsection is intended to have the same effect as the counterpart provision in subsections 185d. and 193f., and the section-by-section analysis of these subsections is applicable here as well.

Subsection f. of section 194 sets forth the criteria by which the Commission will approve an amendment to a design approval and how that amendment shall be applied to facilities which reference the design. These provisions ensure that approved amendments will apply to applications for a construction permit or a combined CP/OL referencing the design approval that are filed after the effective date of the amendment. The amendment, however, will not apply to those applications referencing the design which are filed before the effective date of the amendment unless (1) the applicant requests that the amendment be applicable, or (2) the reopening standards of subsection 194e. are satisfied.

Subsection g. of section 194 provides that any facility permit or license which references a design approval may be granted a variance from the design approval if the Commission determines that the variance will comply with this Act and the Commission's regulations.

A variance granted by the Commission under this subsection will apply only to the facility for which the variance has been requested. Thus, the variance does not apply to other facilities referencing the standardized design approval and does not constitute an amendment to the design approval. The purpose of this provision is to allow a facility-specific deviation from the referenced standardized design if the Commission finds that the deviation from the design will comply with the Atomic Energy Act and the Commission's regulations. Design issues raised by a request for a variance may be considered in a hearing on the application for a license, permit, or an amendment which includes the variance in accordance with subparagraph (D) of section 189a.(1) of the Atomic Energy Act.

Title II -- Miscellaneous Provisions

The provisions contained in section 201 of the bill would add new subsections bb. and cc. to Section 11 of the Act. Section 11bb., as amended, would define a "substantial evidentiary showing" as used in subsections 185d. 189a.(1)(D), 193f., and 194e. of the Act. Section 11cc., as amended, would define "thermal nuclear generation facility" as used in sections 185 and 194 of the Act.

The provisions contained in section 203a. of the bill requires the Commission to propose regulations to implement the provisions of sections 185d., 193f. and 194e. applicable to thermal neutron power generation facilities within 180 days following the effective date of this section.

The provisions of section 203b. of the bill would prohibit the modification of any thermal neutron power generation facility except pursuant to the regulations promulgated under subsection a., once these regulations are promulgated.

Subsection c. of section 203 of the bill assures that an appropriate environmental review will be conducted and an impact statement prepared for any full site approval under section 193 of the Act. However, since need for power and alternative energy source issues probably cannot be assessed in the absence of a specific application for a facility, environmental reviews of these issues would not need to be done at the site approval stage. In addition, an environmental impact statement may not be appropriate and would not be required if the site is reviewed for a limited aspect. Such environmental considerations not assessed in the prior site reviews would be assessed in subsequent reviews of the facility to be located at the site. It is the intent of the Commission, however, to complete the full NEPA environmental review at the earliest possible stage in the approval of a site and a facility.

Subsection d. of section 203 of the bill would establish that no environmental review is required for the issuance of a design approval under section 194 of the Act. Any environmental review of a design would be conducted in connection with the application for a site permit, or an application for a construction permit or a combined CP/OL.

Title III -- Conforming Amendments

These provisions would be necessary to conform other sections of the Atomic Energy Act of 1954 with the provisions contained in this bill. Section 182b. of the Act would also be changed to provide for Advisory Committee on Reactor Safeguards review prior to commencement of operation in the case of a combined construction permit and operating license.

Title IV -- Effective Date

This provisions ensures that all sections of the Atomic Energy Act, including those sections amended by this bill, shall take effect as of the date of enactment and shall apply to all pending and new proceedings. The last phrase requires each proceeding to meet the terms of the Act in order to come under this Act. For example, for an application for a design approval already under review by the Commission to be treated under section 194, such an application will have to meet the requirements of both subsections 194a and 194c.

Attachment 2

ADDITIONAL VIEW OF COMMISSIONER THOMAS M. ROBERTS

I strongly support the goal of reforming the NRC's licensing process so that greater stability, rationality, and efficiency are achieved. Thus, I strongly supported the legislation proposed to the Commission by Jim Tourtellotte, Chairman, Regulatory Reform Task Force. That legislation provided, among other things, for early resolution of various licensing issues and for a one-step licensing process.

The legislation proposed by Jim Tourtellotte has now been substantially revised by the Commission. The changes made by the Commission include:

(1) The provision of a second hearing opportunity to address issues such as emergency planning and quality assurance;

(2) Notice of this second hearing opportunity one year prior to facility operation;

(3) Limitations on the use of combined construction permit/operating license procedures so that only the present types of commercial power reactors are eligible;

(4) Addition of license, site permit, and design approval renewals to the list of actions for which a hearing opportunity will be provided;

(5) The preparation of an environmental impact statement prior to issuance of a site permit; and

(6) The requirement that standardized designs be approved only in case-by-case adjudication, not by rulemaking.

I have reservations about each of these changes as well as about other provisions in the bill. More importantly, however, it seems to me that the Commission's changes circumvent its stated goals of (1) creating a more efficient vehicle for the resolution of disputed safety and environmental issues and (2) avoiding the imposition of regulatory uncertainty and unjustifiable economic burdens or utilities and their ratepayers. In sum, the legislation proposed by the Commission to "reform" its licensing process appears either to "codify" the status quo or to impose additional requirements, especially in the area of notice.

This view will deal only with the three issues which most concern me. My principal concern with this legislation is its provision of a second hearing opportunity when that hearing is not required to protect public safety. This additional hearing opportunity would come at a time when the only tasks remaining to be accomplished are (1) verification of the plant's design and (2) inspection and testing of the plant to insure that it has been built in compliance with the application. To provide a hearing opportunity after the plant is constructed introduces regulatory uncertainty and inefficiency into an already cumbersome process.

Additionally, the provision of a second hearing only one year prior to operation could result in the hearing actually delaying plant operation, a phenomenon which arguably has not yet happened. Presently, the prehearing stage of an adjudicatory operating license hearing begins several years in advance of facility operation because it is triggered by submission of an operating license application. Under the legislation proposed by the Commission, the preoperational hearing is triggered by plant operation. The informal phase of a hybrid hearing is generally equivalent to the prehearing stage of an adjudicatory hearing. Both the informal phase of a hybrid hearing and the prehearing stage of an adjudicatory hearing include, among other things, admission of parties, admission of contentions, discovery, and prehearing conferences to narrow issues. The Commission's experience with these types of activities shows that they generally require more than one year to complete. I know of no reason to expect these activities to take less time in the preoperational hearing merely because they are part of the informal phase of a hybrid hearing.

Moreover, as a general matter, the issues of emergency planning and quality assurance are among the most time-consuming issues presently litigated in operating license proceedings. Thus, the preoperational hearing presents a potential for delay greater than that extant in the present licensing process. As a practical matter, the only way around this potential delay will be a request by applicants that the Staff notice the opportunity for a hearing several years in advance of operation. There is some irony in the thought that applicants would have to request the hearing process be initiated in order to avoid delay!

Finally, I have a philosophical problem with the Commission's decision to provide a second hearing opportunity. The Commission's decision rests on two assumptions--first, that factual disputes should be resolved in adjudicatory hearings be they hybrid or formal and second, that inquiries into safety issues should be handled by trial-type procedures. Under present Commission rules, if a member of the public is aware of a safety problem, that person may come to the Commission and request an investigation. Furthermore, that person may request a hearing. If the Commission decides that there is a safety issue which should be resolved by trial-type procedures, the Commission can grant a hearing. Thus, the opportunity for a hearing already exists; a hearing will be provided if the Commission determines that the safety issue in question is best resolved through that mechanism. What I object to is the requirement to provide an adjudicatory hearing, whether it be hybrid or formal, after every plant is constructed. In that context, it is important to remember that the paramount responsibility of the NRC is not the provision of trial-type forums in which members of the public can attempt to explore their concerns about nuclear power plants. Rather, the NRC's paramount responsibility is to protect the public health and safety. Resolution of technical issues in order to protect the public health and safety is the province of the Commission's highly paid and highly trained scientific and technical staffs.

A second problem with this legislation is its implicit assumption that hybrid hearings will be a more efficient vehicle for the resolution of disputed safety and environmental issues and thus that explicit authority to conduct such hearings will constitute regulatory reform. There are many arguments that one can make to dispute this assumption but I will merely quote from the views of Tony Roisman, an attorney on the Ad Hoc Group on Regulatory Reform Proposals and formerly an intervenor in many Commission licensing proceedings:

> [W]e all realize it is really a dog fight down there in the hearing between people who are unalterably opposed to each other. We are not just talking about the kinds of issues where one can say, well, I can see the other guy's side, but I would sure like to have a crack at making my point. You are dealing with people who are really going to the mat. There is a lot of contentiousness.
>
> What troubles me about the hybrid hearing--and I had a small contact with it during the time I worked on the GESMO hearings, when they were in existence, is it looks like they create more places for that inherent contentiousness to find outlet in irrelevant issues. If two people are disagreed as to whether a particular emergency plan for a plant is going to be adequate, one says it is inherently inadequate, you should never license the plant; the other says it is perfectly good, we can put it here, what you would like to not have happen is for them to spend any significant time arguing about peripheral issues, about whether they are going to argue about that issue. You would like them to get in there and argue about that issue.
>
> The hybrid hearing invites first, a legislative type hearing. All right, we have already taken a lot of time on a legislative type hearing. Then a series of hearings on which of the legislatively presented points of view deserve the next step. The next step, as it was in GESMO, just might be discovery. I have got to see some more information, how did you reach that conclusion, Doctor? We now have discovery.
>
> Now we have another set of hearings on how many of the next set of issues deserve to move to the next plateau, the next plateau being we are going to have some cross examination. And each of those decisions is a point of contention. Each one is one on which the parties spend a lot of time fighting. Each is subject to review by a court. And from the standpoint of the Agency, and again, from the standpoint of

> stability, the one kind of decisions which this agency has uniformly been successful in deciding, in not getting review of substantive issues, every judge, no matter how nastily they may have written about the Commission at any time, you ask them to decide whether it should be pump A or pump B, and they say that is agency expertise. What they will review is your decision to keep an issue in, put an issue out.
>
> And it seems to me that the hybrid hearing will create a new era of litigation unparalleled in this Agency that will cause more turmoil and confusion--and remember, I speak now from the perspective of a former intervenor counsel, that every time the Commission steps in the wrong procedural hole, it is like creating a little time bomb. It is ticking. It ticks along going through a whole hearing, having stepped in the wrong hole, and you don't find out that it was the wrong hole until three years later, or in the case of nuclear waste, ten years later, and then all of a sudden, boom, the thing explodes and hundreds of hours of hearing time; thousands, are down the tube.

The third problem I have with the legislation proposed by the Commission concerns its failure to address the problem of backfitting. The Commission spent a good deal of time debating what standard should be used to allow relitigation of an issue previously decided in a proceeding. The Commission settled on the following standard:

> The Commission shall not modify any final determination on an issue that has been considered and decided in any proceeding . . . unless the proponent of the request for such action makes a substantial evidentiary showing . . . that such action is required to comply with this Act, other provisions of Federal law, or the Commission's regulations.

Regardless of how difficult making that showing might appear, in reality, the proponent of modification of a prior Commission determination need only show that the Commission has promulgated new requirements. Until the Commission promulgates a backfit regulation which would control the application of new requirements to reactors which have received a license and been constructed in accordance with that license, any final determination made in a proceeding can be relitigated by a showing that the Commission has promulgated new requirements related to that determination.

Attachment 3

Commissioner Asselstine adds: On the subject of nuclear powerplant licensing reform, I continue to believe that legislation would be helpful in developing the necessary regulatory framework for the ongoing efforts of several reactor manufacturers to develop more complete standardized plant designs. The recent experience with the construction of the St. Lucie 2 plant in FLorida and the three-unit Palo Verde plant in Arizona, which both represent a form of standardization, indicates that the use of more standardized plant designs can have significant benefits in assuring that plants are constructed properly and within realistic cost and schedule estimates. Some provisions of the NRC and DOE legislative proposals that are less directly related to the use of standardized designs, such as backfitting restrictions, the elimination of certain hearing rights, modifications to adjudicatory hearing procedures, limitations on the role of licensing hearings and attempts to define safety-cost trade-offs, have proven to be controversial. At the same time, there appears to be more of a consensus in favor of other provisions more directly supportive of standardization, such as the authority to issue site permits, standardized design approvals and combined construction permits and operating licenses, together with provisions to assure an opportunity for a hearing on each safety, security and environmental issue at the earliest possible stage in the licensing process.

Given the potential for consensus on these elements and their benefits in encouraging further standardization, I would suggest that the Congress consider a more limited bill that focuses on the provisions most directly related to the standardization concept.

Question. What is the status of licensing reform bills in Congress?

Answer. The NRC licensing reform legislation (H.R. 2512, S. 893) was submitted to Congress in February 1983. Several congressional hearings have been held concerning the proposed NRC legislation and similar licensing reform legislation proposed by the Department of Energy (H.R. 2511, S. 894). To date, no licensing reform legislation has been reported out of committee.

Question. Comment on the Commission's views on a strict one-step licensing process.

Answer. The Commission does not favor the strict one-step licensing process proposed in the DOE legislation. The majority of the Commission favors the combined CP/OL licensing approach in the NRC-proposed legislation which would require a supplemental Commission review prior to the commencement of operation. This review would be to assure that the facility was built in conformance with the Commission's regulations and the CP/OL. In addition, the NRC proposal would provide for a supplemental opportunity for public hearing prior to the commencement of operation. This supplemental hearing would be restricted to matters that were not and could not have been considered in the prior CP/OL hearing. (Some aspects of these issues might be handled at an earlier stage.)

PRICE-ANDERSON ACT

Question. Briefly explain your major recommendations on the need to modify and/or extend the current Price-Anderson Act provisions on utility liability which expires in 1987.

Answer. In its report to Congress of December 1983, "The Price-Anderson Act—The Third Decade," NUREG-0957, on the need for continuation or modification of the Price-Anderson Act, the Commission made the following recommendations:

(1) The Commission recommends that the Congress extend the Price-Anderson Act. The Commission believes that the act provides a valuable public benefit by establishing a system for the prompt and equitable settlement of public liability claims resulting from a nuclear accident. The act should be extended to cover future as well as existing nuclear powerplants.

(2) The Commission recommends that the Congress amend the Price-Anderson Act to substitute an annual limitation on liability for accidents at large commercial nuclear powerplants for the present absolute limitation on liability in the act. This annual limitation on liability would permit the assessment of retrospective premiums in succeeding years until all public liability claims from an accident are paid. The annual limitation on liability should apply to existing (i.e., plants now covered by the act and by indemnification agreements) as well as future plants. This approach should ensure the availability of sufficient insurance funds under the act to pay public liability claims even for high-consequence accidents. At the same time, this approach should avoid imposing potentially catastrophic losses on utilities or suppliers of nuclear goods and services.

(3) The Commission recommends that the Congress amend the Price-Anderson Act to raise the maximum retrospective premiums that can be charged from the present $5 million per reactor per incident to $10 million per reactor per incident per year until all claims are paid. An increase in the size of the retrospective premiums to $10 million would substantially increase the amount of funds available shortly after a nuclear accident to pay public liability claims.

This amount of funds for public liability claims would be roughly comparable to the amount of insurance coverage now provided for most large commercial nuclear powerplants to pay onsite property damage and other utility claims. An increase in the size of the retrospective premiums to $10 million also should not jeopardize the financial viability of the participating utilities.

(4) The Commission recommends that the Congress should retain the present statutory language for the finding of an extraordinary nuclear occurrence to establish a definitive basis for valid claims and conserve resources to pay for these claims. Additionally, the Commission notes that it intends to define, by rulemaking, the criteria for an extraordinary nuclear occurrence.

Commissioners Gilinsky and Asselstine recommended that the Congress eliminate the term "extraordinary nuclear occurrence" from the Price-Anderson Act and amend the act to require the waiver of defenses for all nuclear incidents. This change would establish no-fault coverage for all nuclear incidents, would assure more uniform determinations on recovery for public liability claims from nuclear incidents, and would eliminate difficulties in establishing practical and workable criteria for making ENO determinations.

(5) The Commission recommends that the Congress extend the statute of limitations for filing a public liability claim arising from a nuclear incident from 20 to 30 years. This change should provide greater assurance that latent injuries caused by a nuclear accident are provided protection under the Price-Anderson system. The Commission recommends that experience gained in the future from other administrative systems for compensating latent injury claims be studied, but the Commission does not recommend further changes to the causation and proof of damages provisions of the Price-Anderson Act at this time.

(6) The Commission recommends that the Congress investigate with nuclear liability insurers the potential for increasing the private insurance capacity made available through the insurance pools for the basic layer of insurance. The Commission believes that this capacity has not kept pace in recent years with inflation and should be increased if possible.

(7) Congress should clarify its intent on the following issues that have been or can be sources of uncertainty in implementing Price-Anderson:

(*a*) Application of the waiver of defenses provision of the Price-Anderson Act to all situations in which financial protection is required (i.e., for indemnified nuclear materials licensees) and not just, as presently, to production and utilization facilities (reactors).

(*b*) Exclusion of the costs of investigation, settlement and defense of claims from the two levels of financial protection as well as the presently excluded Government indemnity level.

Question. Comment on the current liability limits which, I believe, were set back in 1957.

Answer. In the form passed in 1957, the act limited the total liability for any single nuclear accident to $500 million in Government funds plus the amount of liability insurance available in the private market—$60 million at the time. Utilities operating large power reactors (with a power level of 100 electrical megawatts (MWe) or more) were required to purchase the maximum available amount of privately underwritten public liability insurance. The act provided that if damages from a nuclear accident exceeded the amount of private insurance coverage ($60 million), the Federal Government would indemnify the utility licensee and other persons indemnified (suppliers, designers, and anyone else who may be liable for the accident) in an amount not to exceed $500 million. The private insurance just described ($60 million in 1957), whereby utilities pay a premium each year for liability coverage of a fixed amount, is also referred to as primary insurance or primary coverage. The obligation by the Government to provide funds for a nuclear accident once the private insurance for that accident has been exhausted is referred to as Government indemnity. The total ceiling on liability, called the limit of liability, was the sum of private insurance coverage plus Government indemnity that amounted to $560 million in 1957.

The act was modified in 1975 to direct the Commission to require that licensees maintaining the maximum amount of financial protection participate in a retrospective premium insurance plan. Under the plan, licensees would be required to pay up to $5 million per reactor per incident in retrospective premiums (also called deferred premiums) in the event of a nuclear incident resulting in damages exceeding the amount of primary insurance purchased from private insurance pools.

The private insurance just described, based on retrospective premiums, is referred to as secondary insurance or secondary coverage. Because the limit of liability remained at $560 million, the effect of the secondary layer of insurance was to reduce the indemnity obligation of the Government. In November 1982, when the 80th large nuclear power reactor plant was licensed, the total retrospective premium became $400 million (80 reactors times $5 million). The $400 million, when added to the $160 million basic insurance layer by now available, resulted in a total of $560 million—equal to the existing limit of liability—so that the need for further Government indemnity funds for such reactors under the current provisions of the act was essentially eliminated. Congress also provided that the limitation of liability comprising the total protection of the primary and secondary layers of insurance would grow in $5 million increments as each new power reactor was licensed to operate. Thus, as of March 1984, the limit of liability is $585 million, $425 million of which is the amount of secondary insurance from 85 licensed reactors.

Although the two layers of insurance provided under the act should provide sufficient liability protection for most nuclear accidents, there remains a low probability of a high-consequence accident that could result in public liability claims well in excess of the present amount of nuclear liability insurance under the act. The limitation on liability has served to prevent potentially catastrophic losses to producers of nuclear goods and services and to utilities that could result from a high-consequence accident. At the same time, the limitation on liability has shifted the risk of such losses to the victims of an accident or, through the subsequent enactment of legislation, to the Federal Government. The Commission believes that the limitation on liability under the Price-Anderson Act should be modified to minimize the potential for uncompensated losses by the victims of a commercial nuclear powerplant accident and to minimize the potential need for additional financial contributions by the Federal Government to meet public liability claims resulting from a commercial nuclear powerplant accident. The modification that the Commission has recommended is described in the response to the preceding question (recommendations 2 and 3).

Question. What do you estimate could be the actual range of damages resulting from a reactor accident?

Answer. In spite of the potentially large consequences of some postulated reactor accident sequences, the risk calculated is usually very low because of the very small likelihood of occurrence of these accidents.[1] As a general rule, the larger the consequences, the smaller the probability of occurrence, so that the estimated monetized risk of a single nuclear accident off-site is usually no larger than some tens of thousands of dollars per year. Of course, these estimates are subject to substantial uncertainties because of the complexities of risk analyses and the lack of an actuarial base of experience.

The consequences depend on many factors, such as the exact operational conditions under which the accident occurs, prevailing weather conditions, population distribution around the reactor site, and assumptions that are made in the analysis of the events associated with the accident and the resulting consequences. The estimates of consequences of a nuclear accident are highly dependent on site-specific and plant-specific factors and are influenced greatly by the assumptions made for purposes of the analysis. Thus, generic conclusions regarding consequence estimates from any risk analysis of specific reactors should be reached only after considering these many factors and uncertainties.

There are also many uncertainties in the various factors that go into the overall assessment of public risks. The probabilities are one such uncertainty. Another is in the estimate of the amount of fission products released (i.e., accident source term estimates). This latter factor is believed by many analysts to be conservative and is a concern currently under extensive reevaluation. Other uncertainties in probabilistic risk assessment relate to completeness. For example, sabotage is not included and the risk from seismic events is frequently not considered. Also, the economic models have not been subject to rigorous critique, especially the property damage models.

The NRC staff and its contractors conducted a study of the source term matter in 1980–81 and published the results in NUREG–0772, "Technical Bases for Estimating Fission Product Behavior During LWR Accidents." That report was not conclusive in establishing substantial reductions in accident source term estimates, but it showed that, with additional research, such reductions were likely to be established. That research has been underway since 1981 and its results are now under peer review by the American Physical Society. A report on the subject is to be released by the NRC for public comment after the scientific peer review of the work is completed in late 1984.

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[1] Risk is the term applied to the result of the consequences multiplied by the probability of an accident occurring.

Present work in probabilistic risk assessment is expected to better characterize the uncertainties, both in accident probabilities and in the analysis of possible releases from the containment. Of course, uncertainties will still remain.

Thus, the current emphasis on risk analysis is part of the continuing long-term effort to improve safety and NRC staff understanding of the overall risk of nuclear powerplants. Probabilistic risk assessment methods are continually evolving to study very unlikely or rare events that could lead to major radioactive releases and to trace through the paths of potential impacts on the environment (persons and property). Subsequent to NRC's completion of its report on accident source terms, an estimate of the range of projected damages resulting from reactor accidents can be made.

NUCLEAR WASTE POLICY ACT

Question. What major new requirements are imposed on the NRC by the Nuclear Waste Policy Act?

Answer. The new requirements imposed by the Nuclear Waste Policy Act (NWPA) are summarized in the following document:

NRC ROLE UNDER THE NUCLEAR WASTE POLICY ACT OF 1982 AND RESULTING NEW REQUIREMENTS

I. NRC's Role In Repository Development Program

	Provisions	NRC Role
1.	Siting Guidelines promulgated by DOE in which NRC concurs. Section 112 (a).	NRC must concur in the DOE siting guidelines.
2.	NRC technical requirements and criteria promulgated. Section 121(b)	NRC must issue regulations which specify the technical requirements and criteria for the repository.
3.	EPA final high-level waste standards promulgated. Section 121(a)	
4.	Conform NRC requirement and criteria to EPA final high-level waste standards. Section 121(b)(2).	Depending on contents of the final EPA standard, action may be necessary by NRC to conform NRC regulations.
5.	DOE Project Decision Schedule (PDS). Section 114(e)	NRC must coordinate with DOE on the development of the Project Decision Schedule.
6.	Draft Mission Plan published by DOE for comments of NRC and others. Sections 216(a) and 301(b)	NRC must coordinate with DOE on the development of DOE Mission Plan, and specify, with precision, any objections to the Plan.
7.	Submission by DOE of Mission Plan to Congress. Section 301(b).	Following approval of the Mission Plan by Congress, NRC will, wherever necessary, conform its waste management program planning guidance to the Plan.
7a.	Provision of information to States/Tribes Section 117(a)	NRC must provide timely and complete information regarding its determinations or plans made on siting, development, design, for licensing, construction, operation, regulation, or decommissioning.
8.	DOE recommends to the President 3 sites for characterization for first repository. Each of the initial 5 sites nominated by DOE prior to recommendation to the President will be accompanied by an environmental assessment (EA). Section 112(b).	NRC staff intends to review and comment on EA's.
9.	President must evaluate the possibility of developing a repository to dispose of defense waste only. Section 8.	If decision is to exclude defense waste from the civilian repository NRC licensing of a separate defense-waste-only repository is required.
10.	Submission by DOE of site characterization plan, waste form or package description, and conceptual repository design to NRC for review and comment. Section 113(b).	NRC will review and comment on DOE submission of each site to be characterized.
11.	DOE submits to the President and the public the Commission's preliminary comments concerning at-depth site characterization and waste form sufficiency for DOE construction authorization application. Section 114(a)(1)(E).	NRC must provide preliminary comments on the adequacy of the at-depth site characterization and waste form sufficiency for DOE construction authorization application.
12.	The DOE Final Environmental Impact Statement (EIS) on the first proposed repository must contain comments from the NRC concerning the DOE draft EIS. Section 114(a)(1)(D).	NRC will review and comment on the DOE draft EIS.
13.	President recommends one site to Congress for construction. Section 114(a)(2)	None

Provisions	NRC Role
14. Submission of notice of disapproval by State, Section 116(b); or Indian tribe, Section 118(a)	None; see 15 below
15. Congress may obtain any comments of the Commission with respect to a State/tribal disapproval of a site. Section 115(g).	The NRC must be cognizant of State/tribal concerns to be in a position to provide knowledgeable comments to Congress.
16. State disapproval will take effect unless both Houses of Congress pass resolution of approval. (90 calendar days of continuous session.) Section 115(c).	None; see 14-15 above.
17. Within 1 year after site disapproval, the President must recommend an alternative site for the first or a subsequent repository. Section 114(a)(3).	Role similar to initial site recommendation. See events 11-15, above.
18. Secretary submits construction authorization application to NRC. Section 114(b).	An NRC licensing proceeding will be initiated on the construction authorization application.
19. NRC must submit to Congress an annual status report. Section 114(c).	NRC will submit an annual status report on the progress of the licensing proceeding to Congress.
20. Commission must issue decision on issuing construction authorization for first repository. Section 114(d)	3 year time period for NRC decision dictates an active program of involvement with DOE, State/tribes prior to receipt of application to identify and resolve contentious issues to the maximum extent practicable. Commission will either grant or deny authorization for DOE to begin construction of the 1st geologic repository. To meet this schedule, a relatively complete, high-quality DOE application will be required.
21. Secretary must recommend 3 sites for characterization to President for second repository site. Section 112 (b)(1)(c).	Same as event 8 above.
22. President must recommend to Congress 1 site, from sites already characterized, for second repository. Section 114(a)(2)(a).	Same as event 10, 11 and 12 above.
23. Submission of construction authorization application to NRC for second repository. Section 114(b).	NRC will initiate licensing proceeding for second repository.
24. Commission must issue decision on issuing construction authorization for second repository. Section 114(d)	3 year time period for NRC decision dictates an active program of involvement with DOE, States/tribes prior to receipt of application to identify and resolve contentious issues to the maximum extent practicable. To meet this schedule, a relatively complete, high-quality DOE application will be required.

II. NRC's Role In The Test and Evaluation (T&E) Facility Program

Provisions	NRC Role
25. DOE may issue T&E facility siting guidelines Section 213(a)	NRC will provide consultation to DOE on its T&E siting guidelines.
26. TEF cooperation and coordination Section 216(a)	NRC shall assist the Secretary by cooperating and coordinating on any reports under Title II.
27. NRC, DOE must conclude written agreement on procedures for T&E facility interaction Section 217(f)(1)	NRC must work with DOE in developing a written agreement for procedures for review, consultation, and coordination in the planning, construction and operation of the T&E facility. Such an understanding shall also establish the types of reports and other information as the Commission may reasonably require to evaluate health and safety impacts of the T&E facility.
28. NRC shall carry out a continuing analysis of the T&E activities to evaluate the adequacy of the consideration of public health and safety issues. Section 217(f)(3)(A).	NRC will carry out a continuing analysis of the activities associated with the DOE T&E facility.
29. NRC required to report to the Secretary, the President, and the Congress Section 217(f)(3)(B).	NRC will report to the President, the Secretary, and the Congress as it deems appropriate.
30. NRC must concur on decontamination and decommissioning of DOE's T&E facility Section 217(h)	NRC will evaluate DOE's decontamination and decommissioning activities, and concur, if deemed appropriate for a T&E facility not located at the site of a repository.

III. NRC's Role for Interim Spent Fuel Storage

Provisions	NRC Role
31. The Secretary, the Commission, and other authorized Federal officials shall each take such actions as such officials consider necessary to encourage and expedite the effective use of available storage, and necessary additional storage, at the site of each civilian nuclear power reactor. Section 132.	The Commission will consider which actions are necessary to implement the intent of this provision.
32. Hybrid procedures are prescribed for hearings on certain applications for licenses for facility expansions of spent fuel storage capacity and trans-shipments of spent fuel. Section 134.	Commission to consider procedures for implementing this hybrid hearing process
33. Issuance of NRC proposed rule establishing procedures and criteria for making and determination that onsite storage cannot reasonably be be provided a reactor and that the person owning and operating the reactor is diligently pursuing licensed alternatives to the use of Federal storage capacity. Section 135(g).	NRC will issue a proposed rule establishing procedures and criteria for determining use of Federal storage capacity. (After public comment NRC will issue a final rule.)
34. If the NRC determines that onsite storage cannot reasonably be provided at a reactor by the licensee DOE may, under certain conditions, provide not more than 1900 metric tons of capacity for storage of spent nuclear fuel from civilian power reactors. Section 135(a)	NRC will make public health and safety determinations as to the use of any existing DOE facility for spent fuel storage and will license storage in new structures, including modular or mobile spent nuclear fuel storage equipment such as dry casks, as required under this provision of the Act.

Provisions	NRC Role
35. Transportation of spent nuclear fuel to a DOE storage facility shall be subject to licensing and regulation by NRC and by the Department of Transportation. Section 137(a).	NRC is required to review DOE's applications for shipment and make licensing determinations for health and safety and safeguards.
36. DOE, in providing for the transportation of spent nuclear fuel under this Act, shall utilize contract private industry to the fullest extent possible in each aspect of such transportation. Section 137(b)	NRC will be required to review the private contractor's application for shipment, and make licensing decisions for health and safety and safeguards. Regulations may, at a future date, be modified or revised to conform with DOE's repository program.
37. NRC shall, by rule establish procedures for the licensing of any technology approved by the NRC under Section 218(a) for use at the site of any civilian nuclear power reactor. [Section 133.] Error exists in Act where reference is made in Section 133 to Section 219(a). Under Section 218(a), NRC may, by rule, approve one or more dry spent fuel storage technologies for use at the sites of civilian nuclear power reactors, to the maximum extent practicable without the need for additional site-specific approvals.	NRC, using data and information from DOE dry storage demonstration and cooperative programs, will develop regulations to approve dry technology storage at civilian nuclear power reactors without, to the maximum extent practicable, the need for additional site-specific approvals by the NRC.
37a. Interim Spent Fuel Storage Cooperation and Coordination, Section 216(a).	NRC shall assist the Secretary by cooperating and coordinating on any reports under Title II.

IV. NRC's Role In Monitored Retrievable Storage Program

Provisions	NRC Role
38. DOE shall consult with the Commission and EPA and shall submit their comments on the MRS proposal to Congress. Section 141(b)(3).	NRC will consult with DOE on development of the MRS proposal, and provide comments to DOE for submittal of the proposal to Congress.
39. Submission by Secretary of an environmental assessment with respect to the MRS proposal to Congress. Section 141(c)(1).	NRC may, if it deems appropriate, comment to DOE on this environmental impact assessment (EA).
40. DOE shall file for license with NRC for MRS Section 141(d).	NRC will develop amendments to 10 CFR Part 72 to provide the licensing framework for the MRS, if it should be authorized by Congress. If authorized NRC will review DOE's application and make the necessary licensing determinations.

V. NRC's Role In The Low-Level Waste Management Area

(No deadlines were provided in the Act for the LLW management provisions under Section 151.)

Provisions	NRC Role
41. Commission authorized to establish by rule, regulation, or order such standards and instructions as it deems necessary or desirable to ensure that each LLW disposal licensee will have adequate financial arrangements for decontamination, decommissioning, site closure and reclamation of sites, structures, and equipment used in conjunction with its LLW disposal Section 151(a)(1).	New sites are covered by existing regulation (10 CFR 61). NRC will review existing regulations and guidance for application at the existing commercial LLW disposal sites.

PROVISIONS	NRC ROLE
42. IF COMMISSION DETERMINES THAT LONG-TERM MAINTENANCE OR MONITORING WILL BE NECESSARY AT AN LLW DISPOSAL SITE COMMISSION MUST ENSURE BEFORE TERMINATION OF THE LICENSE THAT THE LICENSEE HAS MADE ADEQUATE FINANCIAL ARRANGEMENTS TO ENSURE THAT ANY NEEDED LONG-TERM MAINTENANCE OR MONITORING WILL BE CARRIED OUT BY THE PERSON HAVINGTITLE AND CUSTODY FOR SUCH FOLLOWING LICENSE TERMINATION. SECTION 151(A)(2).	MAY REQUIRE RULEMAKING BY THE COMMISSION AND THE DEVELOPMENT OF GUIDANCE FOR BOTH EXISTING AND NEW COMMERCIAL LLW DISPOSAL SITES. FOR EXISTING SITES, ANALYSES WILL BE REQUIRED TO ASSESS: LONG TERM PERFORMANCE; MONITORING AND LONG TERM MAINTENANCE REQUIREMENTS; ASSOCIATED COSTS; AND THE PROGRAM TO REVIEW MONITORING DATA TO IDENTIFY THE NEED FOR MITIGATIVE ACTIONS.
43. DOE SHALL HAVE THE AUTHORITY TO ASSUME TITLE AND CUSTODY OF LLW AND THE LAND ON WHICH SUCH WASTE IS DISPOSED OF, UPON THE REQUEST OF THE OWNER OF SUCH WASTE AND LAND FOLLOWING TERMINATION OF THE LICENSE ISSUED BY THE COMMISSION FOR SUCH DISPOSAL, IF (1) THE COMMISSION DETERMINES THAT THE REQUIREMENTS FOR SITE CLOSURE, DECOMMISSIONING AND DECONTAMINATION HAVE BEEN MET WITH PURSUANT TO SECTION 151(A); (2) THAT SUCH TITLE AND CUSTODY WILL BE TRANSFERRED TO THE DOE WITHOUT COST TO THE FEDERAL GOVERNMENT; AND THAT FEDERAL OWNERSHIP AND MANAGEMENT IS NECESSARY, OR DESIRABLE TO PROTECT THE PUBLIC HEALTH AND SAFETY. SECTION 151(B).	LIKELY TO REQUIRE RULEMAKING/GUIDANCE TO PROVIDE BASIS FOR REQUIRED COMMISSION DETERMINATIONS. SUCH RULEMAKING/GUIDANCE WOULD REQUIRE CLOSE COORDINATION OF DOE WHO APPEARS TO HAVE INDEPENDENT DISCRETION TO ACCEPT SITES FOLLOWING COMMISSION DETERMINATION.
44. ADEQUATE FINANCIAL ARRANGEMENTS FOR LONG-TERM MAINTENANCE AND MONITORING, AS WELL AS DECONTAMINATION AND STABILIZATION OF SPECIAL SITES MUST BE MET IN ACCORDANCE WITH REQUIREMENTS ESTABLISHED BY THE COMMISSION BEFORE DOE MAY ASSUME TITLE AND CUSTODY OF THE WASTE AND THE LAND ON WHICH IT IS DISPOSED. SECTION 151(C).	SIMILIAR TO EVENT 43, ABOVE.

IV. NRC'S ROLE RELATING TO OTHER PROVISION IN THE ACT

PROVISIONS	NRC ROLE
45. WITHIN 90 DAYS OF THE ENACTMENT OF THE ACT, DOE AND NRC MUST PUBLISH A JOINT NOTICE IN THE FEDERAL REGISTER STATING THAT THE U.S. IS PREPARED TO COOPERATE AND PROVIDE TECHNICAL ASSISTANCE TO NON-NUCLEAR WEAPON STATES. THIS JOINT NOTICE IS TO BE UPDATED AND REISSUED ANNUALLY FOR 5 SUCCEEDING YEARS. SECTION 223(B).	NRC TO PREPARE YEARLY A JOINT FEDERAL REGISTER NOTICE AND WILL PROVIDE TECHNICAL ASSISTANCE TO NON-NUCLEAR WEAPON STATES PURSUANT TO THE ACT AND THE FR NOTICE.
46. THE COMMISSION SHALL NOT ISSUE OR RENEW A LICENSE TO USE A UTILIZATION OR PRODUCTION FACILITY UNDER SECTION 103 OR 104 OF THE ATOMIC ENERGY ACT UNLESS THE APPLICANT HAS ENTERED INTO A WASTE DISPOSAL CONTRACT WITH THE SECRETARY OF ENERGY OR THE SECRETARY AFFIRMS IN WRITING THAT THE LICENSEE IS NEGOTIATING IN GOOD FAITH TO ENTER INTO SUCH A CONTRACT. THE NRC IN ITS DISCRETION MAY REQUIRE AS A PRECONDITION TO THE ISSUANCE OR RENEWAL OF A REACTOR LICENSE THAT THE APPLICANT SHALL HAVE ENTERED INTO AN AGREEMENT WITH DOE FOR THE DISPOSAL OF HIGH-LEVEL WASTE OR SPENT FUEL THAT MAY RESULT FROM SUCH A LICENSE. SECTION 302(B)(1)(B).	
47. DOE SHALL CONSULT WITH THE CHAIRMAN OF THE NRC IN CONDUCTING A STUDY OF ALTERNATIVE APPROACHES TO MANAGING CONSTRUCTION AND OPERATION OF ALL CIVILIAN WASTE MANAGEMENT FACILITIES AND THEN DOE IS TO REPORT TO CONGRESS. SECTION 303.	AT THE INVITATION OF THE SECRETARY, NRC CHAIRMAN TO CONSULT ON THE "ALTERNATIVE APPROACHES" STUDY.
48. THE ACT REQUIRES AND AUTHORIZES NRC TO PROMULGATE REGULATIONS OR OTHER SUITABLE COMMISSION GUIDANCE FOR THE TRAINING AND QUALIFICATIONS OF CIVILIAN NUCLEAR POWERPLANT PERSONNEL. SECTION 306.	NRC TO DEVELOP AND PROMULGATE REGULATIONS OR OTHER SUITABLE GUIDANCE FOR TRAINING AND QUALIFYING CIVILIAN POWERPLANT REACTOR PERSONNEL.

Question. I understand that NRC has refused to accept the DOE siting guidelines for the nuclear waste program. Why not?

Answer. The Commission has not refused to accept the guidelines; however, we have identified seven conditions that must be satisfied before we can concur in the guidelines.

The first two conditions involve matters primarily related to NRC concurrence in future revisions to the siting guidelines and DOE's interpretation of Commission regulations. The preliminary decision of the Commission on the siting guidelines (49FR 9650) makes it clear that interpretation of NRC regulations is the responsibility of the Commission and not DOE. Furthermore, the Commission has stated that revisions of the guidelines will be subject to the concurrence of the NRC.

The third condition requires technical modifications to the siting guidelines to achieve consistency between the siting guidelines and 10 CFR part 60.

The fourth condition specifies that DOE should modify the guidelines to make clear that engineered barriers cannot compensate for deficiencies in the geologic media during site screening.

The remaining conditions relate to clarifying how the guidelines will be applied. These conditions include requirements which called for DOE to indicate the kinds of information to be used by DOE to make siting decisions and to include additional disqualifying conditions to ensure that unacceptable sites are eliminated as early as practicable.

Commissioner Roberts' views follow:

COMMISSIONER ROBERTS VIEWS ON DOE SITING GUIDELINES

I believe that the concurrence provisions 5 and 6 go beyond what the Commission is required to do by section 112 of the Nuclear Waste Policy Act. My reading of section 112 is that it would only require that the Commission review the proposed DOE siting guidelines for substantial inconsistencies with our part 60 regulations. Thus, I do not support the position that section 112 requires the NRC to make a sweeping review of the DOE waste program or intrude unnecessarily in their decisionmaking process at this very early stage. To do so would be counterproductive.

If required by the Commission, provisions 5 and 6 would force a level of specificity from DOE which is not warranted and, indeed, would be premature at this stage of the process. Having said that, I am fully cognizant of the substantial concerns raised by a number of States in our oral presentation of January 11. While I am sympathetic toward their concerns, I believe that the Commission must restrict its review to the health and safety factors as embodied in our part 60 regulations. Thus, I support only the inclusion of provisions 1 through 4 and 7 as conditions for concurrence.

Question. Please comment on the progress of negotiations between NRC and DOE staff.

Answer. The NRC staff and DOE staff have begun a series of meetings to attempt to resolve the Commission's concerns on DOE's siting guidelines. NRC staff participating in these meetings believe that DOE staff understand the Commission's concerns and are attempting to address them. Following analysis of public comments received on the preliminary Commission decision published in the Federal Register on March 14, 1984, and any revisions to the guidelines made by DOE, the Commission will make its final decision on concurrence. The Chairman has targeted mid-May for the completion of this process. This target will likely be missed if DOE is unable to satisfactorily incorporate our conditions for concurrence.

DETAIL BREAKDOWN OF BUDGET FUNCTION

Question. For the record, provide an object class or function breakdown in fiscal years 1983, 1984, and 1985 for each major program within nuclear reactor regulation, inspection and enforcement, and nuclear regulatory research. Include in the breakdown for each program the funding and staff levels.

Answer. The function breakdown for NRR, IE, and RES follows:

	Fiscal year 1983		Fiscal year 1984		Fiscal year 1985	
	Dollars	Staff	Dollars	Staff	Dollars	Staff
NUCLEAR REACTOR REGULATION						
Program support:						
Operating reactors	$10,981	243	$10,272	281	$12,270	316
Systematic safety evaluation of operating reactors	465	20	1,200	17	4,200	21
Operator licensing	4,073	34	3,600	44	2,340	52
Casework	12,935	245	11,350	198	7,910	148
Safety technology	10,931	131	11,350	112	8,950	110
TMI-2 cleanup	435	13	250	13	250	13
Management direction and support		49		53		54
Subtotal	39,390	735	37,960	718	35,970	714
Salaries and benefits	37,981		37,710		37,430	
Administrative support	12,000		15,340		14,060	
Travel	1,493		1,730		1,760	
Total	90,844	735	92,680	718	92,050	714
INSPECTION AND ENFORCEMENT						
Program support:						
Reactors under construction	4,163	203	5,850	280	6,050	264
Reactors in operation	5,080	308	6,366	372	8,400	431
Fuel facilities, safeguards, materials, and waste mgt	737	51	824	58	1,400	60
Enforcement, technical support and incident response	2,074	126	1,866	115	2,550	129
Specialized technical training	1,005	17	1,626	17	2,250	17
Management direction and support		137	50	139	50	141
Subtotal	13,059	848	16,526	1,011	21,700	1,087
Salaries and benefits	40,238		47,240		50,010	
Administrative support	10,660		13,170		14,080	
Travel	4,532		5,000		5,300	
Total	68,487	848	81,946	1,011	92,190	1,087
NUCLEAR REGULATORY RESEARCH						
Program support:						
Reactor and facility engineering	35,300	56	37,608	52	35,470	57
Facility operations	11,763	40	12,995	36	8,000	36
Thermal hydraulic transients	22,775	3	27,500	11	21,000	11
Siting and health	8,311	28	8,400	20	8,000	20
Risk analysis	13,935	53	16,200	49	15,300	49
Accident evaluation and mitigation	57,118	22	61,500	25	46,500	25
Loss-of-coolant accident	27,824	10	10,000	7	5,000	7
Waste management	12,275	22	8,346	22	8,400	22
Management direction and support		25		24		24
Subtotal	189,310	259	175,037	246	151,200	246

	Fiscal year 1983		Fiscal year 1984		Fiscal year 1985	
	Dollars	Staff	Dollars	Staff	Dollars	Staff
NUCLEAR REGULATORY RESEARCH—Continued						
Salaries and benefits	13,223		12,730		12,760	
Administrative support	4,060		4,370		3,930	
Travel	697		725		725	
Total	207,295	268	190,862	244	168,415	244

Question. Recent events have demonstrated the importance of emergency planning in the licensing process. In this regard, I understand that your agency is proceeding with plans for emergency plan rulemaking and degraded core rulemaking in the next couple of years. How do you plan to incorporate the lessons learned from the accident at TMI and the TMI R&D program?

Answer. The need for orderly emergency planning was demonstrated by the TMI experience. The lessons learned were incorporated in our regulations over 3 years ago. The NRC staff has been directed by the Chairman to consider revisions to the emergency planning requirements based on experience and further studies of accident risks with current accident source terms. Later, in 1985 when revised source terms are expected to be available, we will reflect them as appropriate by changes in our regulations. The TMI R&D program is expected to make a contribution to our reassessment of source terms. (Please see the answer to the following question for a discussion of how TMI research is incorporated into NRC regulatory information base.)

Question. I understand that TMI is the only integral experiment base we have for a core disruptive accident. I understand that the actual releases of the important radionuclides, such as iodine, were substantially lower than those predicted by the theoretical accident cores of the NRC. This could mean that the implications of an accident may not be so severe as postulated by hypothetical codes. Wouldn't it be in the national interest for the NRC to direct its research program more toward the TMI experimental results to take advantage of information such as this? What plans do you have in this regard?

Answer. NRC continues to feel that TMI research data are an important source of information on severe accidents. In 1979, shortly after the accident, in an exchange of correspondence between then NRC Chairman Joseph Hendrie and DOE Under Secretary Deutch, NRC suggested a cooperative program of research on severe accident causes and consequences and urged that DOE give consideration to funding an examination of the facility. NRC has contributed to that research program and is a part of the research planning effort.

NRC launched a research program shortly after the accident to investigate the actual releases of important radionuclides, noting, as stated in the question, that the release of iodine and some other radionuclides were lower than would have been predicted by the studies then being used for regulatory decisions. This program involves some carefully controlled and well instrumented severe fuel damage experiments which have been underway in the Power Burst Facility (PBF) in Idaho, the annular core research reactor (ACRR) in New Mexico, and in out-of-pile fuel experiments in Oak Ridge, Tenn., and in Germany under a cooperative agreement. This program has proceeded expeditiously and is furnishing vital information for NRC regulatory applications during 1985.

The slow progress of the TMI-2 cleanup and the consequent delays in TMI-2 research to date have made it necessary to reschedule the incorporation of its contribution to the integrated pool of research data on radionuclide release, deposition, and transport to the latter half of this decade. Since NRC radionuclide computer codes require data from precisely defined conditions to verify their accuracy, it would have been difficult to use the TMI fuel data at this stage even if it were to be available. Thus the use of TMI fuel data will be complementary to NRC research data currently being obtained as the program moves ahead in response to regulatory requirements.

The actual temperatures, pressures, and other phenomena which occurred during the accident are inadequately known and involved series of overlapping events which make analysis of the resulting radioactivity release difficult to ascribe to specific occurrences as would be necessary for code verification. By the time the TMI data become available from the DOE/NRC program, the PBF, ACRR, and out-of-pile information will be available to both help understand it, and to allow its integration to provide a relatively complete understanding of severe accident radioactivity.

Question. I have heard that you have been approached by DOE to participate with them in the offsite R&D program at INEL and other national laboratories in order to maximize the assurance that all critical safety research information will be available to the NRC in a timely manner. What plans do you have in this regard?

Answer. The NRC and DOE have been cooperating in the planning and development of appropriate safety research information gathering, and specific offsite examination plans, since shortly after the accident in 1979. As stated in the answer to the preceding question, Chairman Hendrie wrote to DOE's Under Secretary Deutch in 1979 suggesting a cooperative research program on TMI and urged that DOE give strong consideration to the allocation of (DOE) funds and other resources to such research. Today the NRC continues to believe that the major source of U.S. Government funding for TMI-2 research should be channeled through the DOE.

As a consequence of the early cooperation and the NRC initiatives, a four-party agreement was developed among DOE, EPRI, GPU, and NRC toward the collection of valuable data from the damaged reactor plant. A formalized agreement was then signed by NRC with DOE, EPRI, and GPU on March 26, 1980. Since that time, members of the NRC staff have been participating in the detailed planning and implementation guidance for the various information and examination programs.

The NRC plans to continue its relationship with DOE and EPRI in the data gathering from TMI-2 and is putting all of the information to appropriate use. As soon as the data from the nuclear core become available, they will be used in checking severe accident predictive and evaluation techniques and specific isotope release models. The NRC will continue to participate with DOE, EPRI, and industry in detailed planning for the interpretation of information from the TMI-2 reactor.

Question. How much money is planned in the fiscal year 1985 and out-budgets to participate experimentally in the TMI safety R&D program with DOE?

Answer. NRC is actively participating in the TMI safety R&D program with DOE as the prime source of U.S. Government funds. The NRC has, however, set aside some funds from its research budget to assure that an NRC contractor obtains hands-on experience with the TMI-2 core debris examination. This will provide NRC a certain objectivity in understanding the results of the overall off-site core examination effort. The work thus funded is planned as part of the overall off-site examination program in a coordinated effort with DOE and other participants.

In fiscal year 1985 NRC has identified $350,000 for core debris examination. Although most of the U.S. Government funding for TMI information is being provided through DOE, the NRC effort should be considered in the context of the $25 million of NRC fiscal year 1985 funds for carefully characterized severe fuel damage and source term research into which the TMI-2 data will be integrated. The results of this research have been highly useful to NRC and DOE in understanding of the physical and chemical changes to the TMI-2 core and fission product releases during the accident. The results of the program, when correlated with data from the TMI-2 safety R&D program will characterize the TMI-2 core conditions and enable a much improved understanding of the progress of the accident and associated releases. NRC anticipates similar continued participation as an active member of the DOE-funded cooperative effort in the next several fiscal years.

FEDERAL ENERGY REGULATORY COMMISSION

STATEMENT OF RAYMOND J. O'CONNOR, CHAIRMAN

ACCOMPANIED BY WILLIAM G. McDONALD, EXECUTIVE DIRECTOR

PREPARED STATEMENT

Chairman HATFIELD. Chairman O'Connor, if you wish to proceed, your full statement will be placed in the record and I would appreciate it if you will summarize and introduce Mr. McDonald, the Executive Director.

[The statement follows:]

STATEMENT OF RAYMOND J. O'CONNOR

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

I appreciate this opportunity to discuss the Federal Energy Regulatory Commission's FY 1985 budget request with you. I am accompanied today by William G. McDonald, the Executive Director of the Commission, and by the directors of the Commission's legal and technical offices who may assist me in answering your questions.

This morning, after presenting you with a brief overview of the Commission's FY 1985 budget request, I would like to provide you with a status report on the managerial and programmatic initiatives taken in my first 120 days as Chairman of the Commission, relate my expectations for the remainder of fiscal year 1984, and discuss our budget request for FY 1985.

FY 1985 Budget Overview

The Federal Energy Regulatory Commission FY 1985 budget request is for $100,677,000 of which $60,000,000 would be offset through the collection of annual charges and fees. At first glance, the request appears to be significantly higher than our FY 1984 appropriation of $89,582,000; however of the $11,095,000 increase, only 3 percent, or $285,000, represents program changes. The balance, $10,810,000, represents the additional resources necessary just to maintain the current level of operations. These increases include the following:

- $2,362,000 to pay for the 1985 costs associated with the January 1984 pay raise;
- $2,250,000 to pay for the full year costs of new hires in FY 1984 which are primarily the result of completing the transfer of administrative support functions from the Department of Energy;
- $238,000 due to an extra compensable day in FY 1985; and,
- $5,960,000 for supporting non-discretionary increased costs of maintaining current FERC operations, including an

additional $1,611,000 for renting existing office space through the General Services Administration and $4,349,000 for uncontrollable cost increases in non-personnel areas such as travel, telecommunications, guard services, reporting services, and printing.

The budget request includes five program changes which net an increase of $285,000. The program changes are listed below:

- an increase of $759,000 for Energy Information Administration (EIA) energy data support to FERC programs such as natural gas PGA audit analyses and hydroelectric information accessed by FERC staff; In FY 1985, the costs of EIA support will total $5,000,000;
- an increase of $200,000 for bulk power market experiment studies in the Electric Power Program;
- an increase of $130,000 for contractual support for required safety and environmental studies of liquefied natural gas and synthetic natural gas facilities;
- a decrease of $575,000 as a result of completing the contractual work in FY 1984 in the Trans Alaska Pipeline System Case; and
- a decrease of $229,000 associated with the Administration's General Schedule 11-15 grade reduction initiative.

It must be emphasized that this Commission is making every effort to control operating costs. For example, this year we have issued a Final Rule which eliminates the publication of jurisdictional agency determinations in the Federal Register. The budget request represents what I consider to be a minimum funding level for FY 1985. Eighty-five percent of our requested budget is for fixed expenses, including salaries, benefits, and direct support costs. The remainder will be used to pay for energy data support provided by EIA and for program and technical contract support.

Managerial Initiatives

One of the most significant challenges facing the Commission is finding additional methods of improving the quality and timeliness of our products. Substantial progress has been made in recent years to enhance the Commission's ability to process the approximately 85,000 applications, pleadings, memoranda, and other actions that come before us every year.

The General Accounting Office (GAO) recently issued a report on FERC productivity. GAO concluded that FERC productivity had increased 18 percent from 1980 to 1983 but that there was room for improvement. I welcome the GAO report and consider its timing to be fortuitous. I think that the FERC record for productivity improvement is a good one. But I also agree with the GAO report that more can be done, and, quite frankly, I think that the ability of the Commission to adequately address the substantive issues will improve as a result. My initial goal is to show a 3 percent productivity improvement in 1984 through the implementation of the GAO recommendations and our own initiatives.

In this regard GAO has recognized that:

> "Recent budget cuts have limited the amount of training at FERC, and this, in turn is beginning to have bad effects on FERC's operations."

Accordingly, GAO recommended that FERC "give higher priority to training needs in preparing the next budget request for OMB consideration." This assessment and conclusion are absolutely correct. Without an adequate training program, it is unrealistic to expect continued improvements in staff productivity. We have included increased training costs in our request consistent with GAO's concern.

Since becoming Chairman, I have instituted several changes that will enable the Commission to function more effectively. First, I have reviewed the Commission's procedures for the preparation of decisional documents. In too many instances these procedures do not allow the Commissioners adequate time for review and deliberation prior to the Commission meeting. This point was made in the GAO report as well.

Accordingly, I have instructed staff to make greater use of the computerized case tracking system already in place and to gradually modify the case preparation procedures so that items will be circulated to my colleagues well in advance of the Commission meeting. In effect, this initiative will establish a viable agenda forecasting system which will provide a target date for each action requiring Commission consideration. This should allow staff members to schedule their own work in a systematic and more predictable manner while providing the Commissioners with adequate time for review. These efforts should measurably assist the Commission in meeting the goal of deliberate, reasoned decisionmaking.

Another administrative change I have directed is the establishment of rulemaking priorities. After consulting with the Commissioners and senior staff, I reviewed more than one hundred pending rulemakings in order to establish priorities that will guide staff in allocating resources among the various dockets. As a result, I now have prepared a schedule that will allow Commission consideration of these priority matters in an orderly fashion over the coming months. In addition, the Commission has terminated over a dozen pending rules that in our collective judgement no longer require Commission action.

These initiatives include the recent issuance of a rule revising and standardizing the format for the pipelines' purchased gas adjustment (PGA) filings and steps to streamline the procedures for deciding electric rate cases and processing various filings in the hydropower area. For example, the PGA rule should make the pipelines' gas purchase data more useful to the staff and the public for monitoring developments in field markets as wellhead prices are progressively decontrolled pursuant to the Congressionally established schedule. I intend to continue to implement these general managerial steps during the remainder of this fiscal year.

In FY 1985, the Commission plans to continue three efforts which have contributed greatly to enhancing operational efficiency by improving the method of recordkeeping and by making the records more accessible.

The first initiative, started in FY 1981, is an integrated micrographic and computer system to replace the outdated and inefficient manual method of filing and recordkeeping. The second initiative is a legal precedent indexing system that permits full text, rapid legal research by staff through quick access to leading cases, Commission orders, opinions, and decisions. Both systems have freed staff from time-consuming paper searches and have contributed to expediting cases at the Commission.

The third initiative, currently a pilot project, is aimed at better use of office automation. Equipment has been installed to reduce the costs associated with the preparation of Commission documents. Further increases in productivity and office efficiency should be realized through upgrading our automated systems which track the flow of casework and related documents during the regulatory process.

The Commission has been in the forefront of reducing regulatory burden on jurisdictional companies. A program was established in FY 1978 to review all reporting requirements to determine which data were no longer required. This program was expanded in 1980 in anticipation of the Paperwork Reduction Act. To date, 74 forms and applications have been eliminated or revised, resulting in annual savings to industry and consumers of nearly 2,100 workyears and approximately $100 million. In addition, 9 more forms are being reviewed for possible reductions. In short, we have saved as much in reducing unnecessary reporting requirements as we are requesting in our FY 1985 budget.

The Commission expects to complete its initial validation of all FERC reporting requirements by the end of FY 1985. At that time, we estimate that the reporting burden will have been reduced by more than 50 percent since FY 1978.

Natural Gas Regulation

In my first four months as Chairman, the Commission has taken a number of significant actions in the natural gas area. The Columbia PGA pass-through case was brought to the Commission table and decided. Final orders on rehearing were issued approving special marketing programs by three pipelines and one major producer. On an experimental basis, these orders provide increased latitude for the play of competitive forces in affected markets. In conjunction with these orders, the Commission has issued a Notice of Inquiry calling for all interested persons to comment on the advantages and disadvantages of allowing increased competition among gas suppliers.

With regard to minimum commodity bills in pipeline tariffs, the Commission has called for reply comments on a draft rule that would, in effect, ensure that these tariff provisions do not require purchasers to pay for costs that their suppliers do not in fact incur. Review of the minimum commodity bill question presents difficult but important questions. Therefore, I have instructed staff to prepare options for consideration by the Commission within the next 60 days.

Looking ahead to the remainder of this fiscal year and to FY 1985, I am aware that the debate continues on natural gas decontrol legislation. However, in developing our FY 1985 budget, we at the Commission have assumed that the NGPA, with the January 1985 date for decontrol of additional natural gas supplies, will remain in effect. With that in mind, it appears likely that the present state of the natural gas markets, coupled with the impending phased decontrol under the NGPA, will continue to generate a myriad of complex policy and program issues. No easy solutions to these problems are apparent. I am committed, however, to reviewing a number of options that could be taken in the next six to eighteen months to assist the industry and the public in adjusting to the phased removal of wellhead price controls in accordance with existing Congressional mandate. Among the issues which are likely to come before the Commission are the question of the appropriate role for minimum commodity bills, the impacts of gas-to-gas competition, and the financial condition of regulated pipelines.

Under the NGPA, large volumes of natural gas production will be price decontrolled effective January 1, 1985. Decontrol will allow producer-pipeline contracts to operate according to their terms. Absent renegotiation, the price as determined under many of these decontrolled contracts is likely to be in excess of prevailing prices. But since a surplus of natural gas is projected and fuel oil prices are likely to remain highly competitive, the extent to which pipelines will actually pay these higher prices for decontrolled gas is very uncertain. Under these circumstances, pipelines may seek to release the gas and offer transportation services to make it available to other markets, as some pipelines have already begun doing. The decisions by pipeline company managements concerning the release of certain gas, the purchase of other gas, and the payment of particular prices for decontrolled gas will in all likelihood be challenged as imprudent in some, perhaps many, instances. In addition, any resulting supply shifts among pipelines will present important matters for Commission consideration in FY 1985.

Irrespective of what action, if any, the Commission takes on any or all of these issues, we need to avoid precipitous action that might only make matters worse. Regulatory predictability is critically important, not only to the regulated companies but to their lenders, suppliers, and customers as well. At the same time, the Commission must balance that concern against the fact that it may need to take some positive steps in some areas. With so much uncertainty surrounding what in fact will happen in the natural gas markets after January 1, 1985, we must do the utmost to hold regulatory uncertainty to a minimum.

We are requesting a total of $48,636,000 for the Natural Gas Regulation Program in FY 1985.

In summary, the primary focus will be the implementation of the existing Congressional mandate which progressively decontrols additional gas supplies beginning January 1, 1985. In view of the current pressures on the industry, FY 1985 stands to be the most critical period in the NGPA schedule. It is imperative that the Commission be able to respond to those pressures. For that reason, we will require the same level of staff as in FY 1984 to manage this transition effectively.

Hydropower Regulation

Hydropower regulation is a matter of particular concern to many members of this Committee. Over the past four months, I have spent many hours reviewing the Commission's procedures for issuing hydroelectric permits, licenses, and exemptions. The staff has furnished me data detailing how many filings the Commission has received in each of these areas, and of these, how many projects have been approved, how many are under construction, and how many are actually on-line and generating power.

As part of this effort, we have prepared an analysis of exemption applications between the eastern and western regions of the country. This analysis shows that the exemption process authorized by the Congress in 1980 is not meeting Congressional expectations in terms of expediting the construction and completion of qualifying hydro projects.

Disposition of Exemption Applications Filed Between FY 1980 and FY 1983 Inclusive

	Applications Filed	Applications Accepted	Exemptions Issued	Construction Commenced	On Line
East	328	187	170	105	42
West	719	465	343	106	54
Total	1,047	652	513	211	96

Two distinct problem areas emerge, both involving applications for sites in the western United States. The first problem area is in issuing exemptions for sites in the west.

The bulk of the exemptions sought in western states will make use of natural water features which generally require some new construction before they can be used for hydropower generation. This need for new construction has in turn raised the question of whether cumulative environmental impact studies must be performed pursuant to National Environmental Policy Act and applicable court cases for various river basins prior to the Commission approving an exemption or issuing a license. No exemptions or licenses have been issued on the river basins in question for about a year, pending resolution of this issue.

Since becoming Chairman, I have given careful consideration to this question. As a result, I can assure you that within the next four to five weeks I will bring this issue to the Commissioners for a decision on how to proceed. Any decision reached is likely to be contested and, accordingly, must be carefully prepared so as to pass the test of judicial review. Because the issue is raised in pending adjudicatory matters, it would not be appropriate for me to discuss the merits of the question at this time. But I reiterate my commitment to bring this matter to my colleagues for their formal consideration and decision.

The second problem area arises after issuance of the exemption by the Commission, particularly for sites on federal lands. Issuance of an exemption -- unlike a license -- does not provide the power of eminent domain. Nor does it confer water rights necessary for the project. Consequently, only 30 percent of the exemption holders in the western states have commenced construction, as opposed to 60 percent of the exemption holders in the east. These problems are not within the Commission's power to remedy however.

In FY 1985 the Commission expects to complete 1,336 hydropower licensing workload items and 2,036 dam safety inspections. To process this anticipated workload, I will strive to improve staff productivity and streamline the licensing process. These efforts will contribute to limiting the increase in pending actions, while increasing our efforts to process actions on critical new capacity hydroelectric projects.

With respect to the Dam Safety Program, the Commission's responsibilities, as specified by the Federal Power Act, have increased significantly as a result of the large number of licenses issued for new capacity hydroelectric projects in recent years. For example, between FY 1981 and FY 1983 the number of licenses issued increased 89 percent. This trend is continuing, and in FY 1985 the Commission plans to conduct more than 2,000 dam safety inspections, almost 30 percent more than were completed in FY 1983.

Our budget request in the Hydropower Regulation Program totals $26,120,000 in FY 1985.

We are anticipating that the total number of filings in the hydro area will decline next year, primarily due to a continuing decline in the number of preliminary permit and exemption filings. However, the total workload will increase as many of the permit holders apply for a license. The resources requested for FY 1985 will enable the Commission to meet its responsibilities in both the hydropower licensing and dam safety areas.

Oil Pipeline Regulation

Responsibilities extend to approximately 150 common carrier oil pipelines and include the establishment of transportation rates that are fair to shippers and consumers and that also supply adequate incentives for the expansion of oil pipeline systems. We expect to complete 2,084 workload items in FY 1985. Pending workload will decline to 267 items, a 6 percent reduction from the FY 1983 level. The Commission's request totals $3,825,000 in the Oil Pipeline Regulation Program.

Electric Power Regulation

During the last several years, there has been continuing concern about delay in deciding wholesale electric rate cases. Some steps have been taken by my predecessors to expedite these cases and I am committed to pursuing this goal. Accordingly, I have directed staff to review the decisional process for electric rate cases. In this context, I have already directed staff to proceed with proposals to determine generically the rate of return allowed utilities in rate cases and the allowance made in rates for cash working capital. These matters will be presented to the Commission for consideration within the next four months. In the coming months, I will be making recommendations to my colleagues concerning other possible actions to expedite these cases.

In another area, the Commission has approved a two-year program known as the "bulk power market experiment" involving a group of public and private utilities in which certain types of power will be bought and sold on a competitive basis. Transportation, or "wheeling", of the power will be effected automatically to all participants on standard terms. The experiment is designed to determine the extent to which such flexibility will enable the participating utilities to pursue a least-cost purchase strategy, in some cases on an hour-to-hour basis, and to test the desirability of changing the way FERC regulates certain types of wholesale transactions. Ultimately, a more competitive market may result in greater efficiency and lower costs in electric power generation.

Later this year, we may receive requests to authorize similar experiments involving other groups of utilities. Any subsequent filings will be reviewed carefully to make sure that they meet statutory criteria. The Commission will be closely monitoring the operations of any such experiments to gather information and gain expertise on whether more competitive markets may be developed in certain types of electric power transactions and whether these more competitive conditions will in fact enable utilities to operate more efficiently and at lower overall costs.

The inclusion of the cost of construction work in progress (CWIP) in electric rates is another significant issue. Our goal here is to provide a more accurate representation in utility rates of the costs incurred by utilities in planning for and providing long-term, reliable service to their ratepayers. In addition, the CWIP rule is designed to remove any disincentives for utilities to build needed generating facilities. These disincentives tended to result from the traditional regulatory practice of precluding a utility from recouping carrying costs during construction. During the remainder of this fiscal year, staff will be reviewing the effects of the rule as utilities begin to file to include CWIP in their individual rate cases.

We have made considerable progress in approving rate structures for the Power Marketing Administrations (PMA). Last January the Commission issued a rule which approved the Bonneville PMA's cost computation methods for transactions with public utilities. Earlier the Commission issued a Notice of Proposed Rulemaking which clarified the filing requirements and the approval review of rates for the other four PMA's. My schedule calls for bringing the final rulemaking before the Commission by the end of June 1984.

To support the Commission's electric power program, I have requested a budget of $20,096,000 for FY 1985.

The increased funding for bulk power market experiments is very important. In last year's report this Committee urged FERC to develop these experiments. As I mentioned earlier, a bulk power market experiment is now in effect in the Southwest and there may be more applications. In order to study the effects of these experiments we have requested $200,000. The increased funding will provide for a detailed assessment of the competitiveness of the experimental markets and their impact on the cost of generating electricity.

Summary

In conclusion, I will stress programs to continue the improvement of staff productivity and streamline the operations of this Commission. As we enter this most critical period of transition in the history of natural gas regulation, the FERC must be well prepared to meet the inevitable challenges that the NGPA phase-out plan will produce. Consequently, the Commission's budget request for FY 1985 of $100,677,000 is the minimum level of resources needed to continue the productivity gains, as well as to manage the NGPA transition effectively. Our decisions will have an enormous impact on the nation's economic health and well being. The Congress, the public, and the industries we regulate have a right to expect that the FERC's decisions are the products of thorough analysis, consistent and equitable application of our energy policies, and that we will deliver them in a timely fashion. Our ability to perform is directly related to the resources we receive. That is why it is essential that we receive the budget presented to you today.

I appreciate your support and will be pleased to answer your questions.

BUDGET REQUEST

Mr. O'CONNOR. Good morning. I appreciate this opportunity to discuss the Federal Energy Regulatory Commission's fiscal year 1985 budget request with you. I am accompanied by Mr. William G. McDonald, the Executive Director of the Commission.

As I have submitted a written statement for the record, I would like to focus my comments this morning on what has been accomplished in my first 4 months as Chairman and on the initiatives I intend to pursue during the remainder of this fiscal year.

We are requesting $100,677,000 for fiscal year 1985, of which approximately $60 million would be offset through the collection of annual charges and fees. While the request is $11.1 million more than the currently available appropriation, only 3 percent of the increase, or $285,000, represents program changes. The balance of $10.8 million is the cost of maintaining existing Commission programs.

FISCAL YEAR 1984 SUPPLEMENTAL REQUEST

We also have a fiscal year 1984 matter pending before the subcommittee, the pay raise supplemental request of $1.7 million. Our current estimates of fiscal year 1984 staff costs continue to show a $1.7 million shortfall between currently available funding and projected costs. It is imperative that we receive the supplemental to avoid curtailing Commission operations.

I urge you to support the fiscal year 1984 pay supplemental request so the Commission can maintain its programs.

MANAGERIAL INITIATIVES

I would like to discuss briefly some managerial initiatives which have been taken over the last 4 months. One of the most significant challenges facing the Commission is improving agency management. Progress has been made in recent years to enhance the Commission's ability to manage the many thousands of matters that come before us. But much more needs to be done, and, quite frankly, I think that the ability of the Commission to address adequately the substantive issues will improve as a result. I am committed to streamlining and improving the efficiency of the internal operations.

Since becoming Chairman, I have undertaken several administrative initiatives that will enable the Commission to function more effectively. First, I have reviewed and have begun to revise the Commission's case tracking and preparation procedures. I have instructed staff to make greater use of the computerized case tracking system already in place, setting a target date for each item requiring Commission action. In addition, we will modify gradually the case preparation procedures so that items will be circulated to my colleagues well in advance of the Commission meeting date. This should allow staff members to schedule their own work in a systematic and more predictable manner while also providing the Commissioners with adequate time for review.

Another example of the administrative initiatives I have taken is the establishment of rulemaking priorities. The staff is now preparing a schedule that will allow Commission consideration of these priority matters in an orderly fashion over the coming months.

These two actions should measurably assist the Commission in meeting the goal of deliberate, reasoned decisionmaking.

Let me turn now from the managerial to the substantive areas of the Commission's responsibilities. In the natural gas area, a number of major steps have been taken.

NATURAL GAS REGULATION

The Columbia PGA pass-through case was brought to the Commission table and decided. Final orders on rehearing were issued approving special marketing programs by three pipelines and one major producer. On an experimental basis, these orders provide increased latitude for the play of competitive forces in the affected markets. In conjunction with these orders, the Commission has issued a notice of inquiry calling for all interested persons to comment on the advantages and disadvantages of allowing increased competition among gas suppliers.

With regard to minimum commodity bills in pipeline tariffs, the Commission has called for reply comments on a draft rule that would, in effect, ensure that these tariff provisions do not require purchasers to pay for costs that their suppliers do not, in fact, incur. Review of the minimum commodity bill issue presents difficult and important questions. Therefore, I have instructed staff to prepare recommended options for consideration by the Commission within the next 30 to 60 days.

Looking ahead to the remainder of this fiscal year and to fiscal year 1985, it appears clear that the present state of the natural gas markets, coupled with impending phased decontrol under the NGPA, will continue to generate myriad complex policy and program issues. No easy solutions to these problems are apparent. I am committed, however, to reviewing an array of options that could be taken over the next 6 to 18 months to assist the industry and the public in adjusting to the phased removal of wellhead price controls in accordance with existing congressional mandate.

Irrespective of what action, if any, the Commission takes on any or all of these issues, we need to avoid precipitous action that might only make matters worse. Regulatory predictability is critically important, not only to the regulated companies, but to their lenders and customers as well. At the same time, the Commission must balance that concern against the fact that it may need to take some positive steps in some areas. With so much uncertainty surrounding what, in fact, will happen in the natural gas markets after January 1, 1985, we must do the utmost to hold regulatory uncertainty to a minimum.

HYDROPOWER REGULATION

Over the past 4 months, I have also spent many hours reviewing the Commission's procedures for issuing hydroelectric permits, licenses, and exemptions. The staff has furnished me data detailing how many filings the Commission has received in each of these areas, and of these, how many projects have been approved, how many are under construction, and how many are actually on-line and generating power.

As part of this effort, we have prepared an analysis of exemption applications between Eastern and Western regions of the country. It appears in my prepared statement. This analysis shows that the exemption process authorized by the Congress in 1980 is not meeting congressional expectations in terms of expediting the construction and completion of qualifying hydro projects.

Two distinct problem areas emerge, both involving applications for sites in the Western United States. The first problem area is in issuing exemptions for sites in the West.

The bulk of the exemptions sought in Western States will make use of natural water features which generally require some new construction before they can be used for hydropower generation. This need for new construction has, in turn, raised the question of whether cumulative environmental impact studies must be performed pursuant to NEPA and applicable court cases for various river basins prior to the Commission approving an exemption or issuing a license. No exemptions or licenses have been issued on the river basins in question for about a year, pending resolution of this issue.

Over the last 4 months, I have given careful consideration to this question. As a result, I can assure you that within the next 4 weeks I will bring this issue to the Commissioners for a decision on how to proceed. Any decision reached is likely to be contested and, accordingly, must be carefully prepared so as to pass the test of judicial review. Since the issue is raised in pending adjudicatory matters, it would not be appropriate to discuss the merits of the question at this time. But I reiterate my commitment to bring this matter to my colleagues for their formal consideration and decision.

The second problem area arises after issuance of the exemption by the Commission, particularly for sites on Federal lands. Issuance of an exemption, unlike a license, does not provide the power of eminent domain. Nor does it confer water rights necessary for the project. Consequently, only 30 percent of the exemption holders in the Western States have commenced construction, as opposed to 60 percent of the exemption holders in the East. These problems are not within the Commission's power to remedy however.

ELECTRIC POWER REGULATION

With regard to the Commission's regulation of wholesale electric rates, there has been continuing concern, dating back to the late 1970's, about delay in deciding these cases. I have directed staff to proceed with proposals to determine generically the rate of return allowed utilities in rate cases and the allowance made in rates for cash working capital. These matters will be presented to the Commission for consideration within the next 3 months. In the coming months, I will be making recommendations to my colleagues concerning other possible actions to expedite these cases.

BULK POWER MARKET EXPERIMENT

In another area, the Commission has approved a 2-year experimental program involving a group of public and private utilities in which certain types of power will be bought and sold on a competitive basis. Transportation of the power will be offered automatically to all participants on standard terms. The experiment is designed to determine the extent to which such flexibility will enable the participating utilities to pursue a least-cost purchase strategy, in some cases on an hour-to-hour basis. The Commission will be closely monitoring the operations of this experiment. Ultimately, a more competitive market may result in greater efficiency and lower costs in electric power generation.

CONSTRUCTION WORK IN PROGRESS

Another significant issue is the inclusion of the cost of construction work in progress (CWIP) in electric rates. Our goal here is to provide a more accurate representation in utility rates of the costs incurred by utilities in planning for and providing long-term, reliable service to their ratepayers and to remove the disincentives for utilities to build needed generating facilities. During the remainder of this fiscal year, staff will be reviewing the effects of the rule as utilities begin to include CWIP in their individual rate cases.

CONCLUSION

In conclusion, I will stress programs to improve staff productivity and streamline the operation of this Commission. As we enter this critical period of transition in the history of natural gas regulation, the FERC must be well prepared to meet the inevitable challenges that the NGPA phaseout plan will produce. Consequently, the Commission's budget request for fiscal year 1985 provides sufficient resources to continue the productivity gains in our established workload, as well as to manage the NGPA transition effectively. Our decisions will have an enormous impact on the Nation's economic health and well being.

I would appreciate your support and will be pleased to answer your questions.

Chairman HATFIELD. Thank you, Mr. O'Connor.

I believe, Mr. Chairman, that this is your first appearance before our Committee as Chairman of the Commission? We welcome you.

Mr. O'CONNOR. Thank you.

REVENUE COLLECTIONS

Chairman HATFIELD. Mr. O'Connor, we note that your budget request provides for about $60 million in offsetting receipts from licensing fees and/or collectible revenues. Do you need additional authority to collect this level of revenues?

Mr. O'CONNOR. We do not believe we need additional authority to collect $60 million in fee revenue.

Chairman HATFIELD. What has the Commission done under existing authority to increase fees and revenues?

Mr. O'CONNOR. We now have six rules—two final and four pending—concerning fees in three different program areas—gas pipeline certificates, and producer rates and certificates and electric rates. Those notices of proposed rulemaking are within the high-priority category to which I referred in my direct remarks.

The breakdown of the $60 million is approximately $30 million in the hydro area, $15 million in the gas area, $6 million-plus in the electric area, and a small amount in the oil pipeline area. That accounts for $51 million. Another $9 million—making up the $60 million estimate—will be in areas that we will be looking at during fiscal years 1984 and 1985.

Chairman HATFIELD. If I am correct, I believe that in your fiscal year 1984 budget it is estimated that you would collect the level of some $60 million and it appears now that will be about $45 million instead. What will occur that will boost that back up to a $60 million level that you are projecting for 1985?

Mr. O'CONNOR. The proposed rulemakings on the additional filing fees in the various program areas are primarily the areas which will be bringing revenues up to that level in fiscal year 1985.

Chairman HATFIELD. Oil and gas?

Mr. O'CONNOR. It is in the gas pipeline rate area, in the certificate area, and in the producer rate area. I can give you a more detailed breakdown for the record if you would like.

Chairman HATFIELD. Fine, I would appreciate that.

[The information follows:]

CLARIFICATION FOR THE RECORD

Current estimates of the revenue enhancing effects of the six rulemakings by program are depicted in the chart below:

ANNUAL CHARGES AND FEE ESTIMATES

[In millions of dollars]

	Fiscal year 1984 estimates	Revenue effect of new fees	Other changes	Fiscal year 1985 estimates
Natural gas	$10.0	+$6.5	−[1] $2.0	$14.5
Hydropower	32.0		−[2] 2.0	30.0
Electric rates	3.0	+3.0		6.0
Oil pipeline	.1	+.4		.5
Subtotal	45.1	+9.9	−4.0	51.0
Administration initiative			+9.0	9.0
Total	45.1	+9.9	+5.0	60.0

[1] Natural gas fee revenue will decrease by $2 million in the wellhead determination area.

[2] Fiscal year 1984 revenue from hydropower annual charges is expected to be higher than fiscal year 1985 estimates because of late fiscal year 1983 billings for these charges. Some revenues from fiscal year 1983 billings was received in fiscal year 1984 thereby inflating the fiscal year 1984 expected collections.

No new rulemakings are under consideration to effect the additional $9 million in fee collections included in the fiscal year 1985 estimates. It is possible that new legislation would be required to realize these revenues.

Chairman HATFIELD. To try to sense what the distinctions will be in 1985 that were not experienced in 1984, will you select the same level of estimate revenues for 1985?

Mr. O'CONNOR. I think the answer is, Senator, that when I arrived 4 months ago there were some 100 rulemakings pending at the Commission. During the first couple of months we have prioritized those rulemakings, we have terminated a dozen or so, we have several categories of rulemakings remaining and a number of these pending rulemakings did fall into fee generation categories. They will be brought to the Commission for decision over the next 18 months.

POTENTIAL LITIGATION ON NEW FEES

Chairman HATFIELD. Do you have any potential litigation challenging these new rates that you anticipate or you know about?

Mr. O'CONNOR. Not to my knowledge. I will look into that and provide any information for the record, if you would like.

NATURAL GAS REGULATION FUNDING

Chairman HATFIELD. I note also that you have a slightly increased budget for natural gas regulation. According to my information, for the second year now your total workload, including receipts and completions, is substantially lower than the previous year. How do you account for this increase in the level of funding?

Mr. O'CONNOR. This year, fiscal year 1985, is a transition year, Mr. Chairman—I refer to the January 1, 1985 date for the NGPA phased deregulation of approximately half of the gas in the United States—the anticipation of phased deregulation is going to bring before the Commission, assuming there is no legislation in the Congress, many decisions relative to the determination of prices remaining to be regulated. Also, it is anticipated with the January 1, 1985 date coming upon us, that we are going to have a significant number of requests in the transportation of gas and the pipeline certificate areas.

ADDITIONAL PREPARED QUESTIONS SUBMITTED FOR THE RECORD

Chairman HATFIELD. Mr. O'Connor, we have some other questions that I will submit to you for your response for the record. Thank you very much.

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

FERC and the Pacific Northwest Regional Power Council

Question: As you know, I am interested in the relationship between FERC and the Pacific Northwest Regional Power Council's Fish and Wildlife Mitigation Plan. Specifically I have inquired as to FERC's intentions in assessing the cumulative impacts of hydroelectric projects in the Pacific Northwest and how coordination (if any) with the Regional Power Council will take place in assessing cumulative impacts. I am interested in knowing if FERC would be willing to enter into an agreement with the Regional Power Council to undertake cumulative impact studies on a cooperative basis. I am concerned that both agencies will undertake similar programs and have little, if any, coordination.

Answer: The Pacific Northwest Electric Power Planning and Conservation Act requires that, in regulating hydroelectric facilities in the Columbia River basin, the Commission shall take into account to the fullest extent practicable the Pacific Northwest Regional Power Council's fish and wildlife program. The program requires consolidated review of hydroelectric proposals in subject river basins and assessment of cumulative effects of the proposals on fish and wildlife.

The Commission is nearing completion of its determination of its statutory authority and responsibilities with respect to multiple hydroelectric applications in river basins. If the Commission concludes that it will perform cumulative environmental impact analyses in any basins under the Council's purview, I will be happy to discuss with the Council the practical feasibility of cooperating on a study of cumulative impacts on fish and wildlife resources.

Revenue Collection Estimates

Question: Again this year, your budget request provides for $60 million in off-setting receipts from licensing fees or collectible revenues. For the record, please provide an estimate of the revenues in FY 1983, FY 1984 and FY 1985 from each activity.

Answer:

PROGRAM	FY 1983 ACTUAL REVENUES	FY 1984 ESTIMATED REVENUES	FY 1985 ESTIMATED REVENUES
Natural Gas Regulation	$ 2,691,265	$10,000,000	$14,500,000
Hydropower Regulation	9,943,901	32,000,000	30,000,000
Oil Pipeline Regulation	157,750	100,000	500,000
Electric Power Regulation	2,535,230	3,000,000	6,000,000
SUBTOTAL	$15,328,146	$45,100,000	$51,000,000
Administration Initiatives	-	-	9,000,000
Total Offsetting Revenues	-	$45,100,000	$60,000,000

While fees rulemakings will be put into effect later than anticipated, the FERC is still committed to its revenue collection target of $45.1 million in FY 1984. The original estimate for revenue collections in FY 1985 under existing authority was $51 million; however, the Administration determined that this estimate be increased by $9.0 million. As a result, staff is still evaluating areas in which additional revenue enhancements may occur. Additional authorizing legislation may be required.

Regulatory Process in the Pipeline Certificate Program

Question: Describe your efforts to streamline the regulatory process in the pipeline certificate program. Can you quantify the savings in staff time?

Answer: The most recent such effort in the pipeline certificate area has been the blanket certificate program which is aimed at the more routine, non-controversial proposals. Under this approach, once an interstate pipeline obtains a blanket certificate, it is authorized to engage in certain, well-defined transactions which traditionally required individual approvals. At this time, virtually all interstate pipelines have been issued blanket certificates. The program should streamline the regulatory process in two principal ways: first, its self-implementing feature reduces the number of pipeline certificate and abandonment applications which would otherwise be handled on a case-by-case basis; and second, its prior notice procedure should speed up processing times through reduction in filing requirements, internal reports, and time allowed for staff review. The portion known as Phase I (facilities construction, abandonment, changes in delivery points, etc.) was approved during FY 1982. A final rule in Phase II (transportation, sales for resale, related revisions) was issued during FY 1983, with a rehearing order issued early in FY 1984.

Partly as a result of the blanket certificate program, the number of Section 7 applications is lower than for the same period last year. Decreased activity in the industry attributable to current excess deliverability may also have contributed to this reduction. However, the rate at which prior notice requests are being filed exceeds expectations. Most of these involve the transportation of "self-help" gas for end users. Moreover, the number of reports filed in conjunction with self-implementing transactions is considerable. The companies and the Commission staff require time to develop and implement procedures so that efficiencies can be achieved in the recently inaugurated blanket certificate program. It is contemplated that the blanket certificate program will ultimately achieve savings to industry of 24,000 hours annually. We cannot yet quantify the savings in staff time associated with streamlining the regulatory process in the pipeline certificate program.

Streamlining efforts continue to center around the Data Validation Program, which seeks to reduce unnecessary reporting and filing requirements through a comprehensive review of the Commission's regulations and forms, and the Delegation of Authority to high-level staff officials for certain non-contested regulatory activities. The reporting requirements associated with the pipeline certificate program are currently under review and we expect some additional reductions in industry burden and further streamlining of the regulatory processes to result.

Workload in the Gas Pipeline Certificate Program

Question: In the gas pipeline certificate area, where do you expect an increasing workload and why?

Answer: In FY 1985 workload should increase in the following product categories: Construction/Operation/Transportation/Exchange/Storage (Non-Formal), Prior Notice Proceeding, and Import/Export. As deregulation takes effect in FY 1985, additional facilities construction and transportation arrangements should increase the number of pipeline certificate filings. Activity in the Prior Notice Proceedings is especially strong, owing mainly to the transportation arrangements involving lower-cost, self-help gas for end users. The number of requests to date (169) has surpassed the total originally projected for FY 1984 (145). This trend should continue into FY 1985 as additional categories of natural gas are deregulated and both producers and purchasers seek to have gas transported. When compared to FY 1983, the FY 1984 import/export workload is depressed due to the current deliverability surplus of U.S. pipelines and by a variety of circumstances in the exporting countries. Recent events in the exporting countries and the need by U.S. pipelines for long-term supplies may increase activity in this area during FY 1985. Moreover, if market demand begins to outpace domestic supplies, imports may be needed to fill the gap between the time when increased domestic drilling activity begins and actual production results.

Gas Pipeline Rate Workload Versus FY 1985 Budget Request

Question: Briefly describe the workload trends in the Pipeline Rate Regulation Program and the need for an increase in funding.

Answer: As I have previously stated in my budget testimony, any increase in funding is esssentially to maintain the current level of operations. Our staffing level for this program is constant between FY 1984 to FY 1985. Funding increases represent only a prorata share of general overhead expenses, including the recent salary increase.

Over the past two years, there has been an overall increase in the Gas Pipeline Rates actual workload. For example, in FY 1981, actual receipts and completions were 1690 and 1646 respectively while in FY 1983 the levels reached 2214 and 2477, a 20% increase. This high level is expected to continue at least through FY 1985. Completions for FY 1985 are expected to exceed incoming workload thereby resulting in a decrease in the pending workload even with the increasing receipt levels that have been experienced in recent years.

In lieu of filing rate change applications, pipelines are attempting to generate revenues by greater utilization of installed capacity on their systems primarily through the mechanism of transportation transactions. Enactment of the NGPA substantially increased the workload of the Gas Pipeline Rates area because these transactions have been the principal mechanism for the efficient reallocation of natural gas supplies from the intrastate to the interstate market. The receipt levels of these transactions have been increased each year as pipelines continue to respond to demands for increased transportation.

Recent Commission initiatives will accelerate the already subtantial increase in receipt levels of transportation transactions. These include the expansion of the blanket certiticate program to give producers access to new markets. Further, under certain conditions, interstate pipelines are now authorized to transport gas directly between producers and end-users without prior case-by-case Commission approval under Order Nos. 319 and 234 B. Finally, the Commission has authorized Special Marketing Programs for both pipelines and producers which embody transportation as an essential element.

Interstate pipelines' gas purchasing practices and resulting purchased gas adjustment filings (PGAs) will continue to be a significant factor in Gas Pipeline Rate Regulation. With the partial decontrol mandated by NGPA in 1985, it is expected that purchased gas costs may swing dramatically on various pipeline systems as existing contractual provisions such as market-out clauses, renegotiation provisions and various price escalation mechanisms become activited upon deregulation. The recent issuance of Commission Opinion No. 204 expanded the definition of fraud and abuse under the NGPA and has become the general standard for both evaluating the marketing problems faced by interstate pipelines and for denial of recovery of excessive purchased gas costs. It appears reasonable to expect that there will be more customer challenges and more litigation of PGA issues in 1985. Furthermore, because of the potential volatility involving purchased gas costs during this transitory period, many pipelines are expected to request waivers of existing PGA regulations to permit concurrent flowthrough of significant changes of purchased gas costs and thus receive immediate market responses from gas consumers. Expansion of the Commission's onsite audits of purchased gas costs will be required to ensure that only allowable purchased gas costs are being flowed-through to consumers and are flowed-through in a manner consistent with the Commission's Regulations.

Hydropower Regulation Workload Trends

Question: Comment on the trends in workload for hydropower regulation over the last five years.

Answer: The Commission's licensing workload has grown rapidly over the past several years beginning with the Oil Embargo and the subsequent passage of the Public Utility Regulatory Policies Act (PURPA) in 1978. PURPA, along with attendant tax legislation, has increased the economic incentives for small hydro development in the United States.

During the past five years workload receipts in the major categories of the FERC hydropower regulation program have been as follows:

	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984
Hydropower Licensing:					
New Capacity Licenses and Amendments	73	91	263	279	326
Preliminary Permits	501	1,856	944	630	525
Exemptions	-0-	177	475	373	300
Subtotal	574	2,124	1,682	1,282	1,151
Dam Safety:					
Total Inspections	1,229	1,203	1,425	1,585	1,936

This data clearly illustrates the significant increase in the number of applications for new capacity licenses, preliminary permits, and exemptions over the last five years. This data also shows that upon completion of feasibility studies under preliminary permits, the workload has shifted toward more complex and labor intensive developmental applications (licenses and exemptions). Dam Safety inspections have also increased significantly as a direct result of the increase in license applications. This trend is expected to continue for the next several years.

Rationale for Increasing Efforts in New Capacity Licenses

Question: Explain the rationale for increasing efforts in new capacity licenses.

Answer: Staff effort has for many years emphasized timely processing of applications that would result in the installation of new or additional generating capacity. The staff's highest priority is processing license and exemption applications for projects that are ready to start construction. Putting these projects on-line will result in utilization of a renewable resource and corresponding savings in nonrenewable fossil fuel resources.

Resources Needed to Maintain The FY 1984 Pending Level

Question: What additional resources are needed to increase completions in order to maintain the FY 84 level of backlog or pending workload?

Answer: Despite the priority efforts devoted to processing applications for projects with new generating capacity, the current and projected high levels of receipts for major and minor new capacity license applications will result in an increase in overall pending workload in the hydropower licensing area in FY 1985. In these two new capacity licensing categories, pending workload at the end of FY 1985 will exceed the FY 84 year-end total by 125 actions. The increase will more than offset projected reductions in pending workload for the two other major hydroelectric workload areas--preliminary permits and exemptions from licensing. In order to increase completions in new capacity license categories, and thus to maintain the FY 1984 level of pending workload for hydropower licensing, approximately 25 additional positions and $1.0 million would be needed for the hydropower licensing program. Additional resources for this effort have not been requested in FY 1985 in conformance with Administration efforts to reduce Federal spending. Increases in productivity are expected during FY 1985 to help offset increases in pending workload. We will continue to explore areas to reduce pending workload within present staffing levels.

Hydropower Regulation

Question: How much is requested in FY 1985 for consultant inspection services in the dam safety program?

Answer: No funds are requested in FY 1985 for consultant inspection services in the dam safety program. Pursuant to the Commission's dam safety regulations, owners or licensees are required to retain an independent consultant. The independent consultant is an important aspect of the Commission's dam safety program as mandated by the Presidential directive on Federal

Guidelines for Dam Safety issued to the Chairman of the Federal Coordinating Council for Science, Engineering and Technology in 1977. Independent consultant inspections are required at 5-year intervals and for only the larger projects; i.e., 46 percent or 700 of the more than 1,500 dams under Commission jurisdiction. The Commission's staff inspects all high and significant hazard projects annually and low-hazard dams every 2 to 3 years.

Although the independent consultants are selected and paid by owners or licensees, the qualifications of the consultants are reviewed, pursuant to the Commission's regulations, before an inspection is made.

Impact of Court Decision on Oil Pipeline Rate Program

Question: What impact, if any, will the recent Court of Appeals decison on oil pipeline rates have on the FY 1985 budget refinements? On future budgets?

Answer: The Solicitor of the Commission is currently reviewing the options that the Commission has with respect to the decision by the U.S. Court of Appeals for the District of Columbia (Farmers Union Central Exchange Inc., et al. v. FERC, No. 82-2412. Since the Commission has not, at this time, determined what course to follow, it would be premature to attempt to determine what impact the decision may have upon FY 1985 and future budgets. However, a change in the policy enumerated in Opinion No. 154 would unquestionably impose additional resource requirements upon the Commission.

EIA Support Costs

Question: How much was requested and allowed to reimburse EIA in FY 1982, FY 1983 and FY 1984?

Answer:

	FY 1982	FY 1983	FY 1984
Requested EIA Support	...	...	$ 6,000,000
Actual EIA Support	($9,107,000)	($6,000,000)	$ 4,241,000

FERC did not reimburse the Energy Information Administration (EIA) for data services until FY 1984. Prior to FY 1984, the cost of supporting the Commission's energy data needs was included in EIA's budget. In FY 1982 and FY 1983, EIA obligated $9.1 million and $6.0 million respectively, in support of FERC programs. However, during the FY 1984 budget request cycle the Administration included a total of $6.0 million for EIA support in the FERC request of $94.6 million and at the same time, reduced the EIA's budget request by $6.0 million. Congress reduced the Commission's FY 1984 request to $89.6 million leaving only $4.2 million available for this EIA support. It should be noted that the inclusion of EIA support in the Commission's budget is a large part of the increase in FERC's budget from $ 79.7 million in FY 1983 to $89.6 million in FY 1984.

Object Class Breakdown

Question: For the record, provide an object class breakdown in FY 1983, FY 1984, FY 1985 for each program within the four major regulatory functions. Include in the breakdown for each program the funding and staff levels including FTE's levels and the number-on-board.

Answer: The following tables illustrate object class data and FTE levels by program for FY 1983 to FY 1985. Since the Commission does not control by program, these are estimates based upon accounting data which is organized by object class.

The following is provided to illustrate the changes in funding levels from FY 1983 to FY 1985.

FY 1983 Appropriation	79,665
Comparability Adjustments:	
DOE Admin. Support	+3,300
EIA Support	+6,000
FY 1984 Base	88,965
Inflation and Program Changes	+617
FY 1984 Appropriation	89,582
Built-in Increases	+10,810
Program Changes	+285
FY 1985 Request	100,677

FY 1983

Spread of Program by Object Class

Dollars in Thousands

Programs	Salaries	Benefits	Travel	Trans. of Things	Rents, Commun. & Utilities	Printing and Reproduction	Other Services	Supplies and Materials	Capital Equipment	Total
Natural Gas	$26,079	$2,723	$745	$1	$1,341	$1,458	$4,983	$98	$32	$37,460
Pipeline Certs.	8,606	899	90	1	442	481	1,691	33	11	12,254
Pipeline Rate	8,479	886	454		436	474	1,596	32	10	12,367
Producer Certs.	1,665	173	10		86	93	313	6	2	2,348
Producer Rates	2,239	234	15		115	125	423	8	3	3,162
Wellhead	5,090	531	176		262	285	960	19	6	7,329
Hydropower Reg.	13,472	1,406	428	1	693	753	3,559	51	17	20,380
Hydro Licen.	9,633	1,005	150	1	495	538	2,817	36	12	14,687
Dam Safety	3,839	401	278		198	215	742	15	5	5,693
Oil Pipeline	3,517	367	106		181	196	1,902	13	4	6,286
Electric Power	10,627	1,109	598	—	546	594	2,012	40	13	15,539
Total	$53,695	$5,605	$1,877	$2	$2,761	$3,001	$12,456	$202	$66	$79,665

NOTE: Total reflects the FY 1983 Appropriated Level and does not include comparability adjustments of $3.3 million for DOE Administrative Support and $6.0 million for EIA Support.

FY 1984

Spread of Program by Object Class

Dollars in Thousands

Programs	Salaries	Benefits	Travel	Trans. of Things	Rents, Commun. & Utilities	Printing and Reproduction	Other Services	Supplies and Materials	Capital Equipment	Total
Natural Gas	$27,709	$2,851	$866	$14	$4,958	$1,191	$5,168	$787	$33	$43,577
Pipeline Certs.	9,474	975	104	5	1,696	407	2,007	269	11	14,948
Pipeline Rates	10,759	1,107	582	5	1,925	463	1,998	306	13	17,158
Producer Certs.	1,482	152	10	1	265	64	160	42	2	2.178
Producer Rates	1,577	162	19	1	282	67	178	45	2	2,333
Wellhead	4,417	455	151	2	790	190	825	125	5	6,960
Hydropower Reg.	14,306	1,472	495	7	2,559	615	3,232	406	17	23,109
Hydro. Licen.	10,377	1,068	165	5	1,856	446	2,714	295	12	16,938
Dam Safety	3,929	404	330	2	703	169	518	111	5	6,171
Oil Pipeline	3,351	345	108	2	600	144	588	95	4	5,237
Electric Power	10,759	1,107	639	5	1,925	463	2,443	305	13	17,659
Total	$56,125	$5,775	$2,108	$28	$10,042	$2,413	$11,431	$1,593	$67	$89,582

NOTE: Data does not include pay supplemental of $1.7 million.

FY 1985

Spread of Program by Object Class

Dollars in Thousands

Programs	Salaries	Benefits	Travel	Trans. of Things	Rents, Commun. & Utilities	Printing and Reproduction	Other Services	Supplies and Materials	Capital Equipment	Total
Natural Gas	$29,588	$3,253	$930	$14	$5,065	$1,256	$7,606	$894	$30	$48,636
Pipeline Certs.	10,117	1,112	119	5	1,732	429	2,959	306	10	16,789
Pipeline Rates	11,489	1,263	613	6	1,967	488	2,888	347	12	19,073
Producer Certs.	1,582	174	12	-	271	67	277	48	2	2,433
Producer Rates	1,684	185	21	1	288	72	303	51	2	2,607
Wellhead	4,716	519	165	2	807	200	1,179	142	4	7,734
Hydropower Regulation	15,276	1,680	534	7	2,616	648	4,883	461	15	26,120
Hydropower Licensing	11,081	1,219	185	5	1,898	470	3,939	335	11	19,143
Dam Safety	4,195	461	349	2	718	178	944	126	4	6,977
Oil Pipeline	3,578	394	114	2	613	152	860	108	4	5,825
Electric Power Regulation	11,489	1,263	668	6	1,967	488	3,856	347	12	20,096
Total	$59,931	$6,590	$2,246	$29	$10,261	$2,544	$17,205	$1,810	$61	$100,677

Note: **The increase** in the Other Services account is due to increases in technical support contracts, inflationary and **fixed costs** for administrative services and EIA energy data costs.

FY 1983 to FY 1985

Program Spread of Staff

Programs	FY 1983 Alloc.	FY 1983 FTE Usage	FY 1983 Staff On-Board	FY 1984 Alloc.	FY 1984 FTE Usage	FY 1984 Staff On-Board	FY 1985 Alloc.	FY 1985 FTE Usage	FY 1985 Staff On-Board
Natural Gas	845	783	796	860	823	835	860	858	860
Pipeline Certs.	271	251	263	294	281	285	294	293	294
Pipeline Rate	293	272	259	334	320	324	334	333	334
Producer Certs.	51	47	51	46	44	45	46	46	46
Producer Rates	69	64	68	49	47	48	49	49	49
Wellhead	161	149	155	137	131	133	137	137	137
Hydropower	426	395	411	444	425	431	444	443	444
Hydro Licensing	306	284	294	322	308	313	322	321	322
Dam Safety	120	111	117	122	117	118	122	122	122
Oil Pipeline	116	107	107	104	99	101	104	104	104
Electric	325	301	324	334	320	324	334	333	334
Total Commission	1,712	1,586	1,638	1,742	1,667	1,691	1,742	1,738	1,742

NOTE: **The reason for the variance between allocation and FTE usage in FY 1983 and FY 1984 is attributed to salary shortage which limited hiring of new staff.**

Consultant and Related Services

Question: Provide the Committee with a list of the amount requested for consultant and related activities for each program area and a description of the need for the services.

Answer: The following list details the Commission's FY 1984 consultant and related services. The Commission's FY 1985 Congressional Budget does not include funds for consultant and related services.

Program	Title and Description	Amount
Natural Gas	Expert Witness - to appear at hearing to provide oral testimony in AMOCO Production Company proceeding as well as to prepare written testimony and review documents relevant to the case.	$5,500.00
	Expert Witness - fees in connection with consultation during preliminary enforcement investigation.	500.00
Hydropower	Consultant - provide guidance for the public on completion of environmental reports which must accompany applications for license for hydropower projects. In addition, consultant will conduct a study of ways to expedite relicensing of hydropower projects, with special emphasis on the environmental review process.	47,000.00
Electric	Consultant - provide assistance and advise the Commission in the establishment of its Bulk Power Market Experiment Program	13,000.00
Prorated	Consultant - provide assistance in the start-up of the FERC's accounting operations.	24,000.00
Total, FY 1984		$90,000.00

Gregory County Pumped-Storage Hydroelectric Power Project

Question: The Corps of Engineers has identified in the Gregory County hydropower project what they believe is the most cost-effective means of meeting future increased load factors in our region of the nation. Because of the large scope of the project, however, the cooperation of most of the utilities in the region will be required if the project is to be viable, and the State of South Dakota has attempted to organize the necessary participants. Indeed, the State has filed a preliminary application with FERC to build the project.

When do you anticipate FERC will approve or disapprove the State's application?

Answer: A public notice of application for a preliminary permit for Project No. 6774 was issued by the Commission on January 25, 1983. The public notice specified the due date of April 1, 1983, for acceptance of comments, protests, motions to intervene, and filing of an application for license. No petitions to intervene were filed in response to the public notice. The public notice also specified a due date of May 1, 1983, for filing of competing preliminary permit applications by interested parties. No competing applications or notices of intent were filed with the Commission. The application is now pending Commission action to determine issuance of the preliminary permit.

The application for Project No. 6774 presents a question of Commission jurisdiction that has been raised in several other proceedings involving Bureau of Reclamation facilities. Specifically, the Bureau of Reclamation has challenged the Commission's jurisdiction to issue preliminary permits and licenses for a number of non-federal projects to be located at federal facilities at which some hydroelectric power has been authorized for federal development. Although no similar challenge has been made in this case by the Corps of Engineers, the legal principles in the cases are similar. The Commission's resolution of the Bureau of Reclamation's challenges, therefore, may affect its determination of whether the Commission has jurisdiction to issue a permit or license for Project No. 6774.

The Commission resolved the first of the Bureau of Reclamation's challenges in December 1983, when it rejected applications for the Buffalo Bill Project on the ground that the Commission lacked jurisdiction to issue the requested permits and license. Several others are expected to be resolved soon. Based upon this schedule, I anticipate that the Commission will be able to act on the application for Project No. 6774 this Spring.

Question: Does FERC believe at this point that the project appears to be needed and justified based only upon the needs of the Federal preference power users and including as much as $100 million in associated multipurpose (irrigation and water supply) features, as provided in Section 701(b)(10) of S. 1739?

Answer: At this preliminary phase of studies for the proposed project, there is insufficient information to determine the need for the project.

However, a license, if issued, would authorize the Licensee to construct, operate, and maintain a hydroelectric project under Part I of the Federal Power Act. Also, before issuance of a license for the Gregory County Pumped Storage Project, the relationship of the plans of the U.S. Army Corps of Engineers and the scheme of development proposed by the Applicant would be carefully reviewed and investigated and all the conditions of the proposed license would be coordinated with the agencies involved. The need and justification for the project would also be evaluated at that time.

Question: The State believes and the President's public pronouncements would tend to indicate that such projects will require substantial non-Federal funding for construction. Are there instances where Federal and non-Federal funding have been utilized jointly in projects of this sort? Is there any reason such could not be the case in this instance, for example, with Federal funding for the portion of the project serving preference customers and non-Federal funding for the portion of the project serving nonpreference customers?

Answer: For a pumped-storage hydroelectric project whose sole purpose is the development of energy, we are aware of no joint Federal and non-Federal funding program that exists. Such a program would likely require special legislation.

Question: Are there any cases where "regional preference" applies under existing law, and might not regional preference be in order if in fact the State provides a portion of the construction funding?

Answer: There are several cases where "regional preference" applies under existing law. These include the Columbia River basin under the Bonneville Power Administration, and the Niagara Power Project under the authority of the Niagara Redevelopment Act. Customers within the Columbia River basin are granted preference for power generated within the basin over customers outside the basin. Similarly, the Niagara Redevelopment Act gives preference to customers residing within certain eastern states for power generated by the Niagara Project.

The Commission has not used ownership or State funding as a determination of preference. Regional preference, in fact, has only been applied by the Commission through Congressional legislation.

SENATE CONCURRENT RESOLUTION NO. 23

A CONCURRENT RESOLUTION, Memorializing the United States Congress with regard to the authorization and construction of the Gregory County hydroelectric pumped storage facility.

WHEREAS, the state of South Dakota has included the Gregory County project as one of the highest priority water projects in the state water plan; and

WHEREAS, it is the policy of the state that power generated from hydroelectric projects financed by the state shall, insofar as prudently possible, be made available to all citizens of the state; and

WHEREAS, the South Dakota Conservancy District has submitted a preliminary permit application to the United States Federal Energy Regulatory Commission to secure and maintain a priority for a license to construct the Gregory County project; and

WHEREAS, the state has the authority and responsibility to develop and allocate its water resources in a manner that best serves the interests and welfare of the public of this state; and

WHEREAS, the state is willing to form a new partnership with the federal government for the purpose of constructing the Gregory County project, if the state receives its share of the immediate and direct benefits equal to the value of the development opportunity provided and the state resources utilized for the project; and

WHEREAS, successful water development in the state can best be accomplished through federal recognition of the state's right to participate in the planning, development and management of its water resources; and

WHEREAS, federal legislation has been introduced, S. 1739, which would deny the state and all South Dakotans the full opportunity to participate in the planning, development, management and allocation of the potential benefits associated with the Gregory County project; and

WHEREAS, such federal legislation reserves solely to Congress the authority to determine the ultimate use of South Dakota water resources:

NOW, THEREFORE, BE IT RESOLVED, by the Senate of the Fifty-ninth Legislature of the state of South Dakota, the House of Representatives concurring therein, that the United States Congress should take prompt action to revise the authorization language for the Gregory County project in a manner consistent with state policy so as to fully recognize the state's right to participate in the planning, development and management of its water resources and to allow the state to obtain the immediate and direct benefits of the project; and

BE IT FURTHER RESOLVED, that those industries, public and private, interested in the use of the benefits to be derived from the project enter into serious discussion directed to assuring that the greatest possible public benefit will be realized for all the citizens of the state.

Adopted by the Senate, February 22, 1984
Concurred in by the House of Representatives, February 24, 1984

Lowell C Hansen II
Lowell C. Hansen II
President of the Senate

Joyce Hazeltine
Joyce Hazeltine
Secretary of the Senate

Jerome B. Lammers
Speaker of the House

Paul Inman
Paul Inman
Chief Clerk of the House

SUBCOMMITTEE RECESS

Chairman HATFIELD. We will recess until Tuesday, next week, to hear explanation for the request for atomic energy defense activities of the DOE.

[Whereupon, at 10:45 a.m. Wednesday, March 21, the subcommittee was recessed to reconvene at 10 a.m. Tuesday, March 27.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

TUESDAY, MARCH 27, 1984

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcomittee met at 10:12 a.m. in room SD–116, Dirksen Senate Office Building, Hon. Pete Domenici presiding.

Present: Senator Domenici.

NAVAL REACTORS DEVELOPMENT PROGRAM

STATEMENT OF ADM. KINNAIRD R. McKEE, DIRECTOR, NAVAL NUCLEAR PROPULSION PROGRAM

OPENING REMARKS

Senator DOMENICI. The hearing will please come to order.

Admiral McKee, we are pleased to have you as our first witness. We are very short of time. I assume we will have some written questions. We will ask you to answer them as quickly as possible.

PREPARED STATEMENT

Admiral MCKEE. All right, sir. I will be happy to do that.

You have my statement, which I don't plan on reading.

Senator DOMENICI. It will be made a part of the record.

[The statement follows:]

STATEMENT OF ADM. KINNAIRD R. MCKEE

Introduction

Last year, I devoted a significant part of my statement to describing the defense contribution of our nuclear powered warships. I also described the general responsibilities of the Naval Nuclear Propulsion Program, emphasizing some of the basic philosophy that provides the foundation for our record of safe and successful operation.

Since then the responsibilities of the Naval Nuclear Propulsion Program have grown as more ships continue to be delivered to the fleet. We also have important new things to do.

During the past year, we commissioned our fourth Trident submarine, GEORGIA, bringing our Trident submarine force to four with seven more authorized.

We delivered 4 more 688 Class submarines, bringing the 688 force to 25 with 19 more authorized.

The Navy's FY 1985 budget proposes to add another Trident and four attack submarines to that force.

Highly capable 688 Class submarines are entering the fleet in numbers today. Together with the still formidable 637 Class, they constitute an impressive submarine force that can handle its Soviet counterpart.

That is fine for now, but we must also ensure that advantage for the future, in a harsher environment and against opposition by greater numbers of even more capable submarines and aircraft. To do that, we need to press vigorously ahead in all aspects of submarine development, integrating a proper balance of the most useful concepts into a new ship design.

It is with that in mind that the Chief of Naval Operations has identified R&D funding for a new design attack submarine as a top priority item in the President's FY 1985 defense budget request. The Secretary of Defense has endorsed our current plans aimed toward authorization of a lead ship in FY 1989.

This is a major undertaking; one that will draw extensively on R&D work supported by this Committee, so I thought it would be helpful if I explained what the ship must do and why we must get on with it. To do that, we need to focus on the utility of attack submarines and that, in turn, leads directly to a discussion of the tactical utility and the leverage they provide.

Tactical and Strategic Leverage

When we review naval engagements of the past, or estimate the outcome of engagements in the future, there is a tendency to become preoccupied with individual tactical considerations, but more important is the question of how each affected the overall course of the war. What leverage did the individual action, or threat of action, exercise on forces in another theatre and how did that affect the outcome of the war? We must understand this principle of leverage but we must also have the tools to use it to our advantage.

To do this, we must create in the minds of a potential adversary both a certainty and an uncertainty; a certainty with regard to our own ability -- what we can do -- and in combat, a terrible uncertainty as to what we will do. Certainty of our ability to inflict damage can dictate the scope and nature of resources dedicated to protect their forces, while uncertainty as to our intentions can dictate additional commitment of resources and redistribution of their military forces.

The question of whether we win or lose will depend not only on the degree of damage our submarines can inflict, but also on how they influence the overall employment of enemy naval and air forces. In a crisis, fear of our attack submarines ties up Soviet naval and air forces that might otherwise be used against our NATO resupply, in support of a land campaign in Europe, or against our own supply lines. What we would most like to do is to insert such uncertainty into Soviet estimates that they will be deterred from executing their war plans in the first place.

Historical Precedents

The leverage provided by submarine warfare first became evident in the early days of World War I when the German submarine U-9 sank three British cruisers in a single encounter. That action caused the British to withdraw the Grand Fleet - first to Western Scotland, later to North Ireland - while they improved defenses at the Scapa Flow anchorage. They also made a major reassessment of their war plans that effectively reduced the useful size of their battle fleet and enabled an inferior German Navy to pose a more significant threat on the high seas.

German submarine activity also created an attitude of excessive caution that hampered British naval operations for the remainder of the war. The Commander-in-Chief of the Grand Fleet, Sir John Jellicoe, explained it to the Admiralty this way:

"If ... the enemy battle fleet were to turn away from our advancing fleet, I should assume that the intention was to lead us over mines and submarines, and should decline to be so drawn."

Two years later, Admiral Jellicoe lost a singular opportunity to defeat the High Seas Fleet when he failed to pursue after the Germans broke off the engagement at Jutland.

German submarines went on to sink over 5,000 allied ships, 15 million tons, during World War I. In World War II, they sank over 20 million tons. The Battle of the Atlantic required the commitment of immense tactical Allied resources to regain control of that ocean from German submarines. In the Pacific, U.S. submarines accounted for two-thirds of Japanese merchant marine losses and tied up or sank significant elements of the Japanese Fleet; all with a submarine force that represented about three percent of our Pacific fleet.

The physical damage inflicted by submarines in both wars was of critical importance, but their overall contribution was much greater because they forced major diversions of resources in every maritime theatre. The mere suspicion of a submarine presence was enough to influence ship captains, fleet commanders and war planners alike. That has not changed. In the recent Falklands campaign, the sinking of one old cruiser, Belgrano, by the British nuclear submarine, Conqueror, was enough to convince Argentine military leaders they should keep their fleet in port for the duration. They did so, not really knowing whether the British had one submarine in the area or many. After the sinking, they did not even know whether one was there at all. That terrible uncertainty disabled the Argentine fleet far more than the loss of a single cruiser.

Naval Missions

Up to this point, what I have described is the application of basic principles of warfare that will remain as useful in the future as they have been in the past. These include such concepts as security of the base, availability of reserves, cover and deception, concentration of force, and tactical flexibility. Nuclear powered attack submarines create the opportunity to convert these principles into substantial leverage in an even broader dimension.

Today's balanced naval forces are structured to apply these principles in six primary mission areas. The naval strategic deterrent mission is accomplished entirely by our ballistic missile submarines. Our attack submarines have become principal players in strike, anti-submarine, and mine warfare. They also have important supporting roles in amphibious and anti-air warfare missions.

Submarine Characteristics

Our submarines can do these things because of their unique characteristics. They are invisible on station. They can operate alone and unsupported in waters controlled by the enemy, though they also have the ability to operate in coordination with other forces. Finally, they have what it takes to survive in the face of numerically superior opposition. Skillfully employed, our attack submarines can exercise a major influence on the employment of Soviet ships and aircraft -- and in so doing, multiply the effectiveness of our other forces.

What I have just described is guerrilla warfare at sea. Stealth, maneuverability, and firepower are determining factors in that environment. Increased firepower is already on the way with the advent of vertical launchers in the LOS ANGELES class. In submarine warfare, stealth calls for quiet operation while maneuverability dictates a need for speed and depth. These requirements might appear to conflict, but we have the technology to resolve that conflict and obtain increased quiet speed and depth.

LOS ANGELES Class

The design of our present first line attack submarine was something we were working on in the mid 1960's when I was a Lieutenant Commander on Admiral Rickover's staff. Even that was not a completely new ship design. To achieve higher speed, we simply added a more powerful propulsion plant to the basic weapons and sensors arrangement of the STURGEON Class. When the importance of increasing speed became evident, what was intended as a one-of-a-kind experiment quickly expanded into an entire class of submarines -- our present LOS ANGELES Class.

The LOS ANGELES Class exceeded our expectations right from the first, and we have continued to improve the product. Over the years, and within the constraints of the basic design, we have substantially upgraded sensors, weaponry, and quieting. The most recent example is incorporation of vertical cruise missile launchers beginning with the FY 1978 ships. But there are limits to how far we can go with the existing design. We have virtually exhausted the possibilities for the LOS ANGELES Class.

The Soviet View

The Soviets clearly understand the utility of submarines and the extraordinary level of resource commitment needed to counter a serious submarine threat. Again, the precedent is historical. Soviet Admiral of the Fleet Gorshkov sized it up this way:

> For each German U-boat, there were 25 British and U.S. warships and 100 aircraft, and for every German submariner at sea there were 100 British and American anti-submariners. Yet, nevertheless, this significant numerical superiority of defenders was insufficient to force the attackers to fully curtail their active operation. Therefore the question of the ratio of submarines to anti-submarine forces is of great interest even under present-day conditions, since, if ASW

> forces, which were so numerous and technically up to date for that time, possessing a vast superiority, turned out to be capable of only partially limiting the operations of diesel submarines, then what must this superiority be today to counter nuclear submarines, whose combat capabilities cannot be compared with the capabilities of World War II-era submarines.

Submarines offer the Soviets the same leverage they offer us, although we enjoy a significant geographical advantage. If we did not have submarines capable of getting into their backyard, they could concentrate major forces against supply lines we need for NATO reinforcement and against other naval forces. In short, they can pose many of the same problems for us that we do for them -- problems that can only be countered effectively by state-of-the-art U.S. submarines operating near their shores.

Soviet New Developments

Admiral Gorshkov knows this as well as we do. He is determined to build the best submarine force in the world and to do so in significant numbers. The range and depth of the Soviet submarine design and construction effort is awesome. Two recent products of the system attest to its momentum and to the determination of its sponsors. Last year, while we were developing and justifying requirements for the first new U.S. attack submarine design in over twenty years, the Soviets launched two new SSNs, each believed to be the first of a class. Our 688 Class will have to contend with those ships next year. Our new design SSN will have to contend with other, more advanced Soviet designs we expect to appear over the next decade.

Meanwhile, Soviet VICTOR IIIs patrol our side of the Atlantic now. They are very quiet and capable submarines. It is also interesting to note that production of the less quiet ALFA Class appears to have been terminated after a run of seven. Apparently they view the ALFA less useful than the quieter and more capable VICTOR III.

The Soviets have a numerical advantage today - and unless we act quickly, they will eventually gain the qualitative advantage they need to neutralize the leverage we now enjoy.

The New Attack Submarine

We are at a point today where submarines can exercise the same sort of revolutionary influence on naval warfare that the advent of sea based air power brought to World War II. Yet this in no way diminishes the individual and collective usefulness of other naval forces. The leverage and tactical utility of our modern carrier battle groups and amphibious forces still weigh heavily in all of our plans. What submarine forces provide is enhancement, and the ability to influence where and how the Soviets elect to commit their naval resources. We must preserve the qualitative advantage of our submarines that makes this possible.

We have the technology in hand for a new submarine that will substantially out-perform our LOS ANGELES Class, and which should preserve our lead. We need to get on with building the new submarine. It will have a marked improvement in quiet speed, greater depth, better detection capabilities, and greater firepower. We can afford to build these ships without disrupting other important programs. They will not be inexpensive, but they are a good investment, with a high rate of return in terms of the forces they can destroy and the leverage they can provide.

Attack Submarine Summation

In the final analysis, our attack submarines provide unprecedented flexibility and leverage. A relatively small force of 100 modern attack submarines when properly manned and used offers our defense planners substantial opportunities to increase the overall utility and flexibility of our other military forces and to influence, and even control, the concentration of force. In most campaigns, that factor will probably be the determinant. We must ensure that advantage for the future.

Proposed Work

The Naval Reactors portion of the Department of Energy's FY 1985 budget request, of course, covers more than just the developments for the new design submarine and work on the Advanced Fleet Reactor which I explained last year. The work encompasses our overall development effort including materials, plants, and reactors, our cradle-to-grave technical responsibilities for 170 operating reactors and operation of our land-based prototype reactor plants to test new concepts. This year's budget includes $426.4 million for operating expenses, $22.5 million for capital equipment and $48.0 million for construction work for a total of $496.9 million to continue ongoing work to advance nuclear propulsion. I have attached an expanded description.

Control of Radioactivity

I have also attached copies of two reports. One describes the performance of the program last year in controlling radioactive waste and the other describes our performance in minimizing occupational radiation exposure. A review of these will show our extreme care in dealing with radioactivity. Maintaining this record will be a central element in our continuing work and in designing the new attack submarine.

Conclusion

Although work on the new design attack submarine is vitally important to maintain our edge in the 1990's and later, we must still continue to pay attention to the less exotic but vitally important aspect of continuing the safe and reliable operation of the ships we have. This involves careful selection of personnel, vigorous training and careful monitoring of the performance of reactor operators, equipment, and reactor materials throughout the life of our nuclear powered ships.

In short, we have to continue the same kind of careful attention to detail which has been the hallmark of this program since its inception. Without the continued strong support we have enjoyed over the years from Congress, this would not be possible.

Water Cooled Breeder

I am also responsible for a civilian nuclear energy research program - the Water Cooled Breeder program. The origins of this program go back to the development of the Shippingport Atomic Power Station in the mid-1950's - the first central station nuclear power plant in the U.S. The station is now shut down after 25 years of successful operation, the last five of which demonstrated successful operation of the Light Water Breeder Reactor core.

The purpose of the light water breeder effort is to develop and prove the technology for breeding in a light water reactor using a thorium/uranium-233 fuel system. Successful completion of this work will make available for commercial use a technically proven concept that could help meet the Nation's future electrical energy needs. This is the only known way using proven light water reactor technology to improve nuclear fuel use efficiency significantly beyond the one percent presently achievable.

If our predictions on core performance are confirmed, the reactor technology will be available to take advantage of the Nation's abundant thorium reserves - a potential energy source of energy sufficient to meet our needs for hundreds of years. A point of caution though, the use of the light water breeder concept, as with any breeder or converter reactor will require reprocessing of the nuclear fuel to recover the unused uranium and R&D work in other areas such as remote fuel fabrication.

We are now into the last phase of the light water breeder effort - defueling and core evaluation. Defueling of the Shippingport reactor is underway and proceeding smoothly. This work should be finished by the end of this year. The Shippingport power station will then be turned over to another DOE activity for decommissioning.

The core evaluation effort is underway. This work includes examination of the spent light water breeder core and the physical determination of its breeding performance.

The budget request for the Water Cooled Breeder program for FY 1985 is $26.3 million, a reduction of $9 million from the FY 1984 budget. I have attached an expanded discussion of my budget request.

The light water breeder work should be completed by the end of FY 1987. All findings and conclusions will be fully documented and disseminated to industry.

I would be happy to try and answer any questions you may have.

FY 1985 DEPARTMENT OF ENERGY
BUDGET REQUEST
FOR THE
NAVAL REACTORS DEVELOPMENT PROGRAM

The purpose of the Naval Reactors Development program is to design, develop, test, evaluate, improve, and ensure the safe operation of naval nuclear propulsion reactor plants. The intent is to enhance the performance, reliability, and safety of naval reactors while simplifying plant operating and maintenance requirements. The 161 shipboard nuclear propulsion plants currently power over 40% of the Navy's combatant fleet. The continuing support and improvement of nuclear powered propulsion plants is vital to the National defense.

The major program development effort is the Advanced Fleet Reactor which will provide improved plant performance for the next generation of nuclear powered attack submarines. The Advanced Fleet Reactor will incorporate advances in reactor fuels, materials, and plant components generated from an ongoing effort to develop improved reactor cores, concepts, components, and materials. These improvements will result in the Advanced Fleet Reactor being a higher power, quieter, and more reliable reactor plant.

In parallel, development work on further propulsion plant improvements will be incorporated into prototype cores and components for testing and evaluation prior to fleet application. This work will investigate reactor concepts which offer the potential of increased power and longer life. Crucial to the success of these new concepts is a continuing effort to develop and improve reactor materials, fuels, and poisons. These materials must be capable of withstanding new requirements which result from a higher performance core.

Work is proceeding on the Submarine Test Core, which will test improved reactor fuels, materials and techniques that promise enhanced performance, and the Developmental Materials Core, which will be used to evaluate the operational response of new materials, poisons, and configurations. Each of these cores will be tested in prototype land-based reactor plants. These prototype plants provide the only proven means to determine design suitability and adequacy under actual operating plant conditions.

Work to enhance performance and ensure safe and reliable plant operation continues even after a plant or system becomes operational. This work includes the S8G reactor plant used in the TRIDENT ballistic missile submarine as well as other operating plants and the higher power, longer life D2W core. Other ongoing efforts to improve plant performance and further safety and reliability include: continuing tests of prototypical cores and components; improvements to and evaluation and analysis of existing nuclear propulsion plants, cores, components, systems, and materials; and development of replacement components and systems.

The FY 1985 Naval Reactors Development budget request is $496.9 million to continue the work noted above. The FY 1985 request is $3.9 million over the Fiscal Year 1984 budget. The details of the request, by major area, are:

		Budget Authority (in millions)
Reactor Development		
Operating Expenses	$229.3	
Capital Equipment	22.5	
Construction	48.0	
Subtotal		$299.8
Plant Development		
Operating Expenses		$ 63.9
Reactor Operation and Evaluation		
Operating Expenses		$122.0
Program Direction		
Operating Expenses		$ 11.2
TOTAL NAVAL REACTORS DEVELOPMENT		$496.9
		=======

The following discussion summarizes the work in these major areas:

I. REACTOR DEVELOPMENT

Reactor Development focuses on improving the power, capability, reliability, and endurance of naval reactors. Improvements are effected through the design and development of advanced reactor concepts and components and through incorporation of new reactor fuels and materials. Experience with operating reactors and examination of spent cores are also used in developing and evaluating technology to improve reactor performance.

To support present and future reactor plant advances there must be a continuing reactor design effort coupled with analysis of operating reactors. The overall design objective is to improve plant performance by increasing the power capability and endurance of naval reactor cores.

The Advanced Fleet Reactor will provide the improved plant performance necessary for the next generation of nuclear powered submarines. The Advanced Fleet Reactor will have a higher power core in addition to incorporating the latest advanced quieting techniques. Also, design efforts are underway to make this plant simpler and more reliable, giving it more operational flexibility.

Development of advanced materials and fuels is instrumental in improving the power and endurance of a naval reactor. Increasing core performance heightens the need for advanced materials and for advanced analytical models to optimize core designs and arrangements. New fuels, poisons, and materials are developed and tested in operating reactor plant environments to confirm their suitability for naval application.

To test the most promising possibilities, two prototype cores are under development. The Submarine Test Core will be used to test improved reactor fuels and various cladding techniques using different materials and manufacturing treatments. The Developmental Materials Core will test further advances in fuel concepts and, in addition, will provide the means for evaluation of new poisons and advanced design equipment for controlling reactor performance.

Proving out new concepts and designs involves fabrication of reactor plant cores and components for installation, operation and testing in prototype reactor plants to ensure conformance with design criteria. To maintain strict compliance with design specifications, Naval Reactors develops sophisticated manufacturing processes and inspection techniques which are used to aid and monitor core and material vendors.

Examination of spent reactor cores provides valuable information about core performance and the effects of reactor operation on materials. Information gained from these examinations is vital to improving the performance of new cores. Combining this information, sound analysis, and new developments in reactor technology ensures optimal performance and safety.

During FY 1985, Reactor Development work will include: the continuation of the design effort for the Advanced Fleet Reactor, preproduction of fuel elements, and fuel assemblies, analysis and fabrication of major components such as the core barrel, closure head and control drive mechanisms, and intensive thermal, mechanical, and noise testing and analysis; analysis and development work required for the installation of the Submarine Test Core and completion of physics acceptance and certification testing; and continued work on the Developmental Materials Core.

In addition, work will also include: examination of expended cores and irradiated test specimens; evaluation of material corrosion behavior; continued development of the Modified Fuel Process; and continued qualification of noise and vibration design procedures and noise and vibration testing of prototypic components.

Capital Equipment

Capital equipment required for Fiscal Year 1985 provides for the upgrading and replacement of laboratory and prototype plant equipment, components, and systems, such as reactor control, instrumentation and monitoring systems; quality assurance equipment; laboratory analytical and test equipment; and safety equipment.

Construction

Construction funds are requested in FY 1985 to continue two projects: the Materials Facility, project number 82-N-111, which will provide a second source for manufacture of naval nuclear fuel and is in its fourth year of funding; and the Modifications and Additions to Prototype Facilities, project number 81-T-112, which will modify and add engineered safety features to several prototype propulsion plants and is in its fifth year of funding.

II. PLANT DEVELOPMENT

Plant Development provides for improving reactor plant capability exclusive of the reactor itself, with primary emphasis on improving plant reliability and performance, increasing ease of plant operation and maintenance, and improving plant shock resistance. The work is important because propulsion plant characteristics cannot be improved solely through work on the reactor. To realize any significant increase in overall propulsion plant capability, plant development work must progress hand in hand with advances in reactor technology.

Principal efforts include the development of improved plant components and systems, alternate plant structural materials, improved material processing treatment methods to reduce corrosion, and new methods for chemistry treatment and water purification. The component and system development effort encompasses primary plant fluid, mechanical, and electrical systems and instrumentation, reactor plant control systems and components; and primary and secondary plant components.

A sound understanding of the properties and characteristics of various materials and water chemistries is vital to determining the efficiency and reliability of a reactor plant. A comprehensive testing and evaluation effort selects candidate materials having improved corrosion, fatigue and wear characteristics. Water chemistry and purification work is done to determine methods having the least adverse effect while keeping the coolant as free from corrosion products as possible.

In FY 1985, Naval Reactors will continue Plant Development efforts including: development, testing, and evaluation of reactor plant components and component materials such as improved power supplies; plant analyses to develop and maintain operating and casualty procedures; testing of various steam generator servicing techniques; testing of improved water chemistry treatments; the design of microprocessor-based instrumentation and control equipment; and operating multi-purpose test facilities for use in evaluating problems and improving plant performance.

III. REACTOR OPERATION AND EVALUATION

Reactor Operation and Evaluation involves the operation, servicing, upgrading, and testing of the eight land-based prototype nuclear propulsion plants. These prototypes are operated to test developmental concepts, components and cores for naval nuclear propulsion plants, and are fully instrumented to provide data needed for the evaluation of reactor plant equipment.

A great deal of testing of individual materials, components and systems is done, leading to the selection of the most promising for incorporation into a prototype plant. Only in the operating prototype plants can actual in-service conditions be duplicated and, consequently, a determination made as to true attributes, design suitability and adequacy. To operate for a core lifetime requires in excess of thirteen years. Equipment cannot be withheld from the fleet this long, but a lead time of two to three years is allowed prior to use in fleet nuclear propulsion plants. Once equipment is committed to shipboard plants, the prototype continues the vital function of operating ahead of the shipboard plants to determine operating characteristics and detect any potential problems in the later years of operation. Additionally, performance of this testing in prototype plants avoids interference with fleet activities.

Servicing of the prototype plants is also performed. The servicing work includes maintenance, refuelings, disassembly, fuel exchange and reassembly, component examination, and component removal and replacement. Equipment and procedures for performing this servicing work are developed and refined, and are used to the maximum extent possible in carrying out fleet servicing work.

For FY 1985, work in the Reactor Operation and Evaluation area will include: operation of the prototype plants; design, development, and checkout of servicing and refueling systems, equipment, and procedures; completing the D1G prototype plant interim inspection and overhaul; commencing the S5G prototype plant refueling and overhaul; preparing for the S1W and S3G prototype plant refuelings and overhauls; and performance of reactor plant nuclear, thermal, hydraulic, and mechanical tests, plant modifications, routine maintenance and training.

IV. PROGRAM DIRECTION

To support the Naval Reactors Development and Water Cooled Breeder programs, the program direction funds provide for salaries, benefits, travel, and other expenses for 213 full time Federal employees at the Naval Reactors, Pittsburgh Naval Reactors, and Schenectady Naval Reactors Offices.

Naval Reactors operates with austere staffing. Existing personnel are used to the greatest extent practicable in staffing new efforts and expansions of existing programs. Improvements in work force productivity have been achieved over the years, despite increasing workloads, by effective use of available staff.

FY 1985 DEPARTMENT OF ENERGY BUDGET REQUEST FOR THE WATER COOLED BREEDER PROGRAM

The Water Cooled Breeder Program is developing technology to significantly improve the utilization of nuclear fuel resources for electrical power generation. The concept being evaluated is a self-sustaining breeder reactor, cooled and moderated with ordinary (light) water and fueled with uranium-233 and thorium.

The primary objectives of the program are to: prove that breeding can be achieved in a light water nuclear power plant using a thorium/uranium-233 fuel system; confirm a practical way to use thorium, a plentiful source of fuel for which there has been no major energy related use; and show the feasibility of installing cores of the light water breeder type in pressurized water reactor plants using existing types of plant components and systems.

A light water breeder core operated successfully in the Shippingport Atomic Power Station reactor for five years until shutdown in late 1982. Subsequently, the reactor underwent end-of-life testing and is now being defueled. Preparations are underway for core evaluation at the Naval Reactors Expended Core

Facility in Idaho to verify core performance, including breeding characteristics.

The FY 1985 Water Cooled Breeder budget request is $26.3 million. The details of the budget request, by category are:

	Budget Authority
Operating Expenses	(in millions)
Defueling Activities	$ 8.0
Core Evaluation	18.3
Total, Water Cooled Breeder	$26.3

A discussion by category follows:

I. Defueling Activities

The Shippingport reactor defueling effort, shipments of spent fuel assemblies to the Expended Core Facility, and turnover of the Shippingport Atomic Power Station to the DOE Office of Waste Management for decommissioning will be completed by the end of FY 1984. Other defueling activities will continue until completion of fuel shipments from the Expended Core Facility to the Idaho Chemical Processing Plant in FY 1987 for long term storage.

FY 1985 defueling work will include: fuel receipt, handling, and storage at the Expended Core Facility; loading casks for shipping the spent fuel to the Idaho Chemical Processing Plant; safety assessments for shipping casks and loading methods; equipment design, including a system to dewater and dry the spent fuel for long term storage; and publishing technical reports on Shippingport reactor operation, end-of-life test results, and defueling.

II. Core Evaluation

Detailed evaluation of spent fuel assemblies at the Expended Core Facility will verify core performance and breeding characteristics. During FY 1984, installation of fuel module disassembly and inspection equipment will be completed and fuel module disassembly to obtain fuel rods for subsequent examination will commence. Some fuel rods will be sent to Argonne National Laboratory for destructive chemical analysis to calibrate the non-destructive assay equipment. Destructive analysis work is funded under the DOE Fuel Cycle Program.

Core evaluation work in FY 1985 includes completing disassembly of fuel modules, continuing proof-of-breeding through non-destructive and destructive assay, publishing technical reports on initial non-destructive and destructive assay test data, and initiating core and structural materials examinations. Core and structural material examinations will determine the performance of unique design features in the breeder reactor and whether the thorium/uranium-233 fuel system is a practical energy source. These examinations include visual inspection of fuel modules and fuel rods for appearance and integrity, determination of fuel rod dimensional changes, measurement of cladding oxide thickness, and determination of rod to rod spacing changes.

NAVAL REACTORS PROGRAM OVERVIEW

Admiral McKEE. I would like to take the few minutes we have to talk a little bit about our program and our focus in the year to come. Also, I will give you some fairly sensitive information which supports the reasons behind these actions.

As you well know, we have commissioned the *Albuquerque.*

Senator DOMENICI. Yes, sir.

Admiral McKEE. You are aware of our submarine program. We are at the point where 40 percent of the Navy's combatant ships are nuclear powered. That is a considerable piece of our national strategic deterrent and our tactical forces. I have 172 operating reactors in my program, on both the Navy and the DOE side, with a total of 2,700 reactor-years of operation. I have 142 operating ships, 28 under contract. So, we have a lot on our plate.

As you know, our program is a cradle-to-grave operation where we not only do the basic research but are also responsible for the training of operators and overall maintenance of the ships and also designing new ones.

We are bringing to a close our experience in the commercial nuclear power business. We have shut down the light-water breeder reactor at Shippingport. It is being defueled now and we will finish defueling activities and core evaluation toward the end of 1987.

If I may, Senator, I am going to get up and walk around a little bit and show you some of this.

We have a growing responsibility in the naval program. Our responsibilities are directly proportional to the number of ships we operate. As you can see, the trend has gone up dramatically.

We also have to train the people that operate these ships. As you recall, that is a Department of Energy responsibility. The Department of Energy certifies them as safe operators to the Navy. The number of people we have had to train continues to grow. It is beginning to level off now as we achieve our force levels.

Now, the principal thing we are going to be doing this year is developing a reactor plant for a new class of attack submarines. The 688 class submarine, like *Albuquerque,* is about a 20-year-old design. It was being designed by Admiral Rickover when I worked for him as a lieutenant commander, back in 1964. We have not done anything since then except improve that design. It is time to get on with the next development.

SUBMARINE MISSIONS

This is the kind of submarine we are talking about. We have to build a submarine that can do these things. It must operate alone and unsupported, conduct defensive and offensive operations, remain on station for a long time, and survive. Basically we are talking about a weapons system that has to be independent. It cannot be dependent on outside sources for support. They have to take care of themselves. To be able to exercise the kind of leverage that provides a payoff for these very expensive ships, they will have to be able to operate in waters controlled by the enemy. That leverage is very important.

What do I mean by "leverage"? It is like buying insurance or investing your money. What we want to do is find a system where the amount of resources that we destroy or tie up or force them to reallocate is far out of proportion to the dollar investment that we put in.

Submarines have that kind of leverage. It is a historic theme. You may recall World War I when one German submarine sank three enemy cruisers in one afternoon and forced the redeployment of the entire British fleet. In the Falklands conflict, one British submarine sank one cruiser and the Argentine fleet didn't come outside the 12-mile limit for the rest of the war. They didn't even know whether that submarine was still there or not.

What leverage means is the ability to create a certainty and uncertainty: a certainty in the minds of the other guys as to what we can do, what the ships are capable of, and a terrible uncertainty as to what we will do. It is that terrible uncertainty that gnaws at the fabric of the war plans they attempt to put together.

Senator DOMENICI. [Deleted.]

Admiral MCKEE. [Deleted.]

Senator DOMENICI. [Deleted.]

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Senator DOMENICI. [Deleted.]

Admiral MCKEE. [Deleted.]

And it is nothing new, Senator Domenici. This concept of military leverage is something that has been well understood in our country for a long time—Stonewall Jackson, folks like that.

So that is the point I am trying to make. New attack submarines are going to be expensive ships, but the leverage that you get is going to be very important and it is going to more than let them pay their way. [Deleted.]

The new submarine we are talking about is going to have improvements in many areas. I understand you don't have time to go into detail this morning. I would love to go through it with you, but those are the kinds of improvements we are going to make.

SOVIET PROGRESS

The other point I want to get across to you is to validate some of what I have said because it is important for you to understand that we know what we are talking about. This is the time of year when folks in uniform always come over and holler the Russians are coming and they are getting better. That is what I am going to do.

Senator DOMENICI. Just so they haven't arrived in Wisconsin yet. [Laughter.]

Admiral MCKEE. They are not in Wisconsin yet, or New Mexico.

Senator DOMENICI. I told somebody that some of you all, not you, act like they already left San Francisco and have arrived in Oshkosh, Wis. I don't know why I picked that.

Admiral MCKEE. All I am going to say is the Soviets are getting better. [Deleted.] The Soviets have been getting better for a couple of years. They are pouring extraordinary resources into the business.

[Deleted.]

Senator DOMENICI. [Deleted.]

Admiral MCKEE. [Deleted.]

Senator DOMENICI. [Deleted.]

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Admiral MCKEE. [Deleted.]

NEW DESIGN ATTACK SUBMARINE

Senator DOMENICI. What is in this appropriation request for that advanced submarine?

Admiral MCKEE. On the Department of Energy side, the total is not specifically set aside, but the figure is around $60 million. The Navy has a delta in there for about $174 million. It is not clear cut because the powerplant is derived from a wide range of R&D lines that we run, just as the submarine R&D is derived from a wide range of lines. The total bill is much more than that, but that is the delta in there this year.

Senator DOMENICI. Is the power system brand new?

Admiral MCKEE. Yes, sir. It is a combination of technology we learned in building TRIDENT X, ongoing development work and new building techniques. [Deleted.]

CLOSING REMARKS

I think that is about all I should try to tell you because of the time. I have a lot more in the material here.

Senator DOMENICI. Do you mind staying around a little bit?

Admiral MCKEE. No, sir, I would be happy to.

PREPARED QUESTIONS SUBMITTED FOR THE RECORD

Senator DOMENICI. We are going to give the written questions to you. I may ask a couple of them. If not, I will give them all to you for response in writing.

Let's get the other witnesses in here. They have gone to a lot of trouble as well. I don't want to cut them short.

Thank you for your testimony today, Admiral McKee.

[A brief recess was taken.]

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Naval Reactors

Advanced Fleet Reactor

Question: Please describe the progress being made on the Advanced Fleet Reactor. How much funding is provided in FY 83, 84, and 85 for this effort? What is the total estimated cost?

Answer: Deleted.

The final reactor design has been chosen for the Advanced Fleet Reactor. Selected long lead material is presently on order; plant design, development of key components and core manufacturing development are all proceeding; and advanced physics and thermal/hydraulic design and analysis is underway, as well as hydraulic and materials testing. Deleted.

The Advanced Fleet Reactor will benefit from a combination of ongoing research and development efforts which makes it difficult to identify an overall cost. The incremental material funding attributable to the Advanced Fleet Reactor effort is less than $5 million for FY 1983, $27 million for FY 1984, and $59 million for FY 1985. The remainder required is difficult to estimate at this stage, but is expected to be about $250 million.

Question: When would you expect the DOD to request a new submarine that would use this reactor?

Answer: The Navy will be requesting authorization of the lead ship of a new class of attack submarines in fiscal year 1989. The Navy presently has development work underway on this new attack submarine class. The Advanced Fleet Reactor, which is the latest generation of pressurized water reactors for naval propulsion, will be used in this class.

Operating Expenses

Question: Why do you need the large increase in operating expenses? For the record, please provide a detailed breakdown with explanation of the need for each increase.

Answer: Operating expenses increase by $56.4 million in fiscal year 1985. The Advanced Fleet Reactor work is responsible for $32 million of the increase. Major Advanced Fleet Reactor work being performed in fiscal year 1985 includes: core development and preproduction; procurement of long lead material for reactor test and prototype components; component fabrication; design of a prototypical loop for full scale testing of reactor plant components; and confirmation of nuclear characteristics. Aside from a $16.4 million increase for inflation, other items contributing to the requested increase in operating expenses include a $5 million increase for the overhaul and refueling of the S5G prototype reactor, and $3 million for consolidation of laboratory work areas for the handling of radioactive material.

New Design Attack Submarine

Question: What are the estimated costs of the new design attack submarine and how does this compare to our other submarines? How do you respond to the argument that we should build more, less expensive submarines rather than the new attack submarine?

Answer: The Secretary of the Navy has established a ceiling price of $1.6 billion in FY 1985 dollars for the lead ship of the new design attack submarine class, coming down to $1.0 billion each for the fifth and later ships. The FY 1985 budget now before Congress identifies a price of $701.5 million for an improved SSN 688 to be delivered in FY 1989.

Having larger numbers of less expensive and less capable ships would be a waste of money. The qualitative advantage is what enables our submarines to cope with a numerically larger Soviet submarine fleet. If we build less capable ships, but it takes two of them to defeat an adversary or they cannot carry out necessary missions, there is no cost savings.

Materials Facilities

Question: Describe the status of the Materials Facility construction project at Savannah River.

Answer: The Fuel Materials Facility construction project is proceeding on schedule and should be completed in fiscal year 1986. Presently, design work is more than two-thirds complete. Construction of the main manufacturing building is underway, with the foundation and structural steel work 90 percent complete. After facility start-up and qualification, production of nuclear fuel is scheduled to begin in fiscal year 1987.

Question: What is the status of the fuel fabrication facility at Erwin, Tennessee?

Answer: The Erwin, Tennessee fuel fabrication facility is owned and operated by Nuclear Fuel Services, Inc., and is currently producing nuclear fuel for use in Naval reactor cores.

Question: Do you expect that this facility will continue in operation? How long?

Answer: Current projections of Naval nuclear fuel requirements indicate a continuing need for this facility. This need is expected to continue for the foreseeable future.

Modifications and Additions to Prototype Facilities

Question: Please describe the status of the modification and additions to prototype facilities.

Answer: The modifications and additions to prototype facilities project will enhance the continued safe operation of Naval Reactors prototype reactor plants by adding engineered safety systems to the S1C, S3G, and D1G prototypes.

Design work is progressing, though the new design safety systems for operation within existing plants are requiring more design work than previously projected. Construction of buildings and systems is in progress at the S1C prototype in Windsor, CT., as is construction of buildings for the D1G and S3G prototypes at West Milton, NY.

Water Cooled Breeder Reactor

Question: Describe the status of the Water Cooled Breeder program. Please provide a detailed breakdown of defueling activities in FY 1985 with funding requirements.

Answer: The Water Cooled Breeder program is a mature effort that will be completed by the end of FY 1987. A light water breeder core operated successfully in the Shippingport Atomic Power Station reactor for five years until shutdown in late 1982. Subsequently, the reactor underwent end-of-life testing and is now being defueled. Over half the spent fuel assemblies have been shipped to the Naval Reactors Expended Core Facility in Idaho and defueling of the Light Water Breeder Reactor will be completed by the end of FY 1984.

Preparations are underway for core evaluation at the Expended Core Facility to verify core performance, including breeding characteristics. The equipment needed for fuel disassembly and assay is installed and undergoing final qualification checks. Argonne National Laboratory has completed check-out of their equipment using irradiation test rods and is prepared to begin destructive analysis of selected fuel rods which will provide data to calibrate the assay gage to be used at the Expended Core Facility.

Defueling activities will continue until the last shipment of spent fuel to the Idaho Chemical Processing Plant for long term storage is completed in FY 1987. Defueling work in FY 1985 will include: fuel receipt, handling, and storage at the Expended Core Facility; loading casks for shipping the spent fuel to the Idaho Chemical Processing Plant; safety assessments for shipping casks and loading methods; equipment design, including a system to dewater and dry the spent fuel for long term storage; and publishing reports on Shippingport reactor operation, end-of-life test results, and defueling. Funds necessary to complete defueling activities scheduled in FY 1985 are estimated to be $8.0 million.

Question: What is the status of the proof-of-breeding program for the Light Water Breeder Reactor?

Answer: Proof-of-breeding work is part of the core evaluation effort. Work is presently going on to prepare for the actual evaluation efforts. The equipment needed for disassembly and assay is installed and undergoing final qualification checks. Also personnel training and preparation of examination procedures are underway. The actual evaluation at the Expended Core Facility will consist of core examination and proof-of-breeding. For the proof-of-breeding aspect, 500 individual fuel rods will be non-destructively assayed. Detailed evaluation of the spent fuel assemblies will determine the extent of breeding.

A related part is the destructive analysis work at the Argonne National Laboratory. Argonne has completed destructive chemical analysis of the assay gage validation rod and is prepared to begin destructive analysis of selected breeder core rods. Destructive analysis of the breeder core rods will provide data to calibrate the assay gage to be used at the Expended Core Facility.

Question: What is the status and future plans for the Shippingport site?

Answer: The Shippingport Atomic Power Station terminated power operation on October 1, 1982 with the shutdown of the Light Water Breeder Reactor. Defueling of the reactor and shipment of the fuel from the site will be completed by the end of FY 1984.

When the last fuel modules are shipped, responsibility for the station will be turned over to another group within DOE, the Office of Terminal Waste Disposal and Remedial Action, for decommissioning. The decommissioning contractor has been selected and is to be on site in the spring of 1984 to begin preparations for decommissioning.

Question: Why is it necessary to evaluate the reactor's core over the next several years as you plan?

Answer: It is necessary to evaluate the Light Water Breeder Reactor core now since the spent core is available, specialized equipment has been built and is currently installed and being checked out and qualified, and the uniquely qualified technical people who built the core are available now to do the technical evaluation. A General Accounting Office review in 1983 confirmed that the core should be evaluated and that present plans are the most cost effective way to accomplish the evaluation.

Initial data obtained from operation of the Light Water Breeder Reactor indicates that the core performed as predicted. However, verification of how well the core bred is necessary to determine potential uranium requirements of the Light Water Breeder Reactor concept. Determining performance of fuel, structural materials, and various features to extend fuel burn-up through physical examination, will tell how close the materials were to their limiting conditions after having operated for almost twice their design life. Information on the core's material condition is also of interest for non-breeding reactor designs.

Deferral of core evaluation work would mean a major R&D effort of significant potential benefit would be left hanging when over 90% complete.

Question: Have you had any recent indications that the nuclear industry is interested in the Light Water Breeder Reactor?

Answer: The nuclear industry has indicated interest in the Light Water Breeder Reactor. General Accounting Office reviews in 1981 and 1983 found the nuclear industry was knowledgeable concerning the Light Water Breeder Reactor and wanted the work completed so they could have Light Water Breeder Reactor technology available for potential future application. Currently, industry is applying various facets of Light Water Breeder Reactor technology such as the use of computer codes, and metallurgy and fuel cycles studies.

ATOMIC ENERGY DEFENSE ACTIVITIES

STATEMENT OF ROBERT L. MORGAN, DEPUTY ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY

ACCOMPANIED BY:

- MAJ. GEN. WILLIAM W. HOOVER, DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATIONS
- F. CHARLES GILBERT, DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS
- JAMES W. CULPEPPER, DEPUTY ASSISTANT SECRETARY FOR SECURITY AFFAIRS
- RICHARD L. WAGNER, ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY)

PREPARED STATEMENTS

Senator DOMENICI. Let's proceed, Mr. Morgan, with your testimony on the weapons activities of DOE.

Mr. MORGAN. I'd like to submit the testimony of the Deputy Assistant Secretaries and myself as part of the record, and I would like to also submit as part of the record the vu-graphs that I am planning to use as part of my testimony.

[The statements follow:]

STATEMENT OF ROBERT L. MORGAN

INTRODUCTION

Mr. Chairman and members of the Committee, it is my pleasure to be here today to share with you the rationale to support the Defense Programs portion of the Department of Energy's Atomic Energy Defense Activities appropriation request for Fiscal Year 1985 and our Supplemental request for Fiscal Year 1984.

With me today are Dr. Richard Wagner, Assistant to the Secretary of Defense for Atomic Energy; Major General William W. Hoover, Deputy Assistant Secretary for Military Application; Dr. F. Charles Gilbert, Deputy Assistant Secretary for Nuclear Materials; Mr. James W. Culpepper, Deputy Assistant Secretary for Security Affairs; and Mr. Charles V. Boykin, Defense Programs newly appointed Deputy Assistant Secretary for Intelligence.

Mr. Boykin's intelligence organization, formerly part of the Defense Programs Office of International Security Affairs, is responsible for all Department of Energy intelligence activities. The intelligence organization is placed in Defense Programs because of its close working relationship with our Office of International Security Affairs and the weapons laboratories. Mr. Boykin will have direct access to the Office of the Secretary.

Because of Mr. Boykin's very recent appointment, Mr. Culpepper will cover the intelligence budget request.

THE WHY OF DEFENSE PROGRAMS

(Chart 1) The Department of Energy is responsible for designing, developing, testing, producing, and maintaining all of the United States' nuclear weapons in support of the Department of Defense, and the other supporting functions shown on this Chart. The Defense Department's requirements are coordinated with the Department of Energy to assure that we in DOE will be able to satisfy them; then these requirements are specifically approved by the President (Chart 2). This Department of Defense/Department of

Energy/White House relationship is in accordance with the Atomic Energy Act of 1954, and the subsequent legislation establishing the Department of Energy.

Dr. Wagner, who will follow me in presenting his testimony, will elaborate further on the cooperative relationship between our two Departments.

ADJUSTING TO CHANGE

Because the work of our organization is vital to the national defense, we must strive to conduct our business in a manner that will prompt neither a negative public nor regulatory reaction which could threaten to compromise our ability to get the job done; we must manage our business in ways that we as citizens, would hope that other industrial operations would be managed.

This means our operations must be carried out in a secure, safe, and environmentally responsible manner. In addition, our operations must produce the required weapons quantities while meeting the stringent quality requirements that will assure their safety and reliability. All of our efforts must be managed efficiently and economically.

In recent years the operational standards against which we must work have been changing. The experience of the Three Mile Island incident has tightened the standards and practice for the operation of defense related reactors. The increasing world-wide incidence of terrorist activities has required that we enhance the physical security afforded nuclear materials in our sensitive facilities. Our ongoing efforts to effectively manage radioactivity since the inception of our program have paid off; but now, the adequacy of previously accepted industrial standards and practices for management of other chemicals and waste for the protection of the environment and the public is more and more coming into question.

We are adjusting to each of these changes in a careful, responsible way. We have reviewed our most critical facilities and operations to define areas needing improvement. We are continuing these studies throughout the Defense Programs complex. We have developed prioritized plans for addressing the identified deficiences. Our Fiscal Year 1984 supplemental request and our Fiscal Year 1985 budget request that we will justify to you, contain near-term priority upgrades necessary to correct known deficiencies. Our primary responsibility, however, is to produce and maintain the nuclear weapons stockpile in a safe, secure, and environmentally responsible manner.

THE ISSUES

In their testimony following my statement, the Defense Programs Deputy Assistant Secretaries will be describing their responsibilities and the manner in which they are addressed in the Fiscal Year 1985 budget and Fiscal Year 1984 supplemental request. They will cover the major issues and challenges before them, and they will address the security, safety, and environmental actions proposed and underway to assure the success of their programs.

General Hoover, the Deputy Assistant Secretary for Military Application, will address the reasons why, in support of the Defense Department, we are engaged in a substantial effort to replace the older weapons in the United States arsenal with more advanced state-of-the-art systems along with some of the technical challenges involved in pursuing the President's Strategic Defense Initiative and other weapon developments.

Dr. Gilbert, the Deputy Assistant Secretary for Nuclear Materials, will discuss the reasons why the Department must continue to produce increased quantities of plutonium and tritium for the weapon program and the steps we are planning, to provide for responsible interim and long-term management of our radioactive waste.

Mr. Culpepper, the Deputy Assistant Secretary for Security Affairs, will discuss with you the issues associated with safeguards and security at our nuclear facilities, classification concerns and activities of the Verification and Control Technology program.

BUDGET REQUESTS

(Chart 3) Our Fiscal Year 1985 appropriation request for Defense Programs totals $7.3 billion. In addition the request for the Fiscal Year 1984 Supplemental is $157.6 million (Chart 4). General Hoover, Dr. Gilbert, and Mr. Culpepper will explain in detail the specific requirements for their programs.

(Chart 5) Because our work is in direct support of the United States military nuclear forces, it seems appropriate, for perspective, to compare the size of the Department's Defense Programs effort to the combined total of the nuclear force effort in the Department of Defense and in the Department of Energy. In that context, in Fiscal Year 1985, our budget request comprises about 15 percent of the total. In Fiscal Year 1984, the percentage is about 15 percent, and in Fiscal Year 1983, it was approximately 14 percent.

In the context of prior year budgets, our Fiscal Year 1985 request and the Fiscal Year 1984 supplemental may seem large. I suggest that in the context of the Department of Defense budget for nuclear weapon systems, our request is not only very reasonable, but it is also consistent with Congressional action in prior years.

While we are all concerned about budget deficits, our primary objective within Defense Programs is to provide the nuclear warheads to support the strategic posture of the Administration. We believe our budget request will continue to provide for balanced support of the Department of Defense.

I will be pleased to answer any questions the Committee may have.

BIOGRAPHICAL SKETCH

ROBERT L. MORGAN

Robert L. Morgan was appointed Principal Deputy Assistant Secretary for Defense Programs, U.S. Department of Energy (DOE) on January 3, 1984. He also continues in his dual position as Manager of the Department's Savannah River Operations Office in South Carolina, which he has held since March 1, 1980.

Prior to his new appointment as Principal Deputy in the Defense Programs Office, Mr. Morgan served as Director of DOE's Nuclear Waste Policy Act Project Office since appointment on January 31, 1983.

Mr. Morgan began working with the U.S. reactor development program in 1959 while with the U.S. Army at the Idaho Operations Office of the then, Atomic Energy Commission.

In June 1965, he resigned his commission and accepted a position at the Savannah River Operations Office. He was concerned with the development of work in the Heavy Water Organic Cooled Power Reactor program and when the program was transferred to Canogo Park, California in 1966, Mr. Morgan became the Senior Representative at that site for reactor development programs.

Mr. Morgan rejoined the staff at the Savannah River Operations Office in July 1973 as Deputy Manager. In November 1977, he was detailed to DOE Headquarters in Washington where he first served as Acting Director for Field Operations Management for the Assistant Secretary for Energy Technology. In May 1978, he was assigned as Acting Director of the Office of Nuclear Waste Management. He returned to full time status at the Savannah River Operations Office in November 1978 where, in addition to his duties as Deputy Manager, he also served as Assistant Manager for Health, Safety and Environment.

In February 1981, Mr. Morgan was once again detailed to DOE's Washington Headquarters to serve as Acting Assistant Secretary for Defense Programs, and in July 1983, as Acting Deputy Under Secretary. Since 1981, Mr. Morgan has also served as the Department's representative to the Southeastern Federal Regional Council and the Southern States Energy Board.

Mr. Morgan graduated with a B.S. degree from the U.S. Military Academy in 1952, and an M.S. degree in Civil and Nuclear Engineering from the Massachusetts Institute of Technology in 1959.

He is married to the former Arden Park of Hayward, California, and they have three children. They reside in Aiken, South Carolina.

February 1984

DEFENSE PROGRAMS

Chart 1

DEFENSE PROGRAMS MISSION

- DESIGN, TEST AND MANUFACTURE ALL U.S. NUCLEAR WEAPONS
- DEVELOP INERTIAL FUSION IN SUPPORT OF THE NATION'S MILITARY NEEDS
- PRODUCE ALL NUCLEAR MATERIALS REQUIRED FOR THE U.S. WEAPONS PROGRAM AND MANAGE DEFENSE NUCLEAR WASTE
- ENSURE THE PROTECTION, CONTROL AND ACCOUNTABILITY OF SPECIAL NUCLEAR MATERIALS AND DOE FACILITIES
- ENSURE VERIFICATION OF INTERNATIONAL ARMS AGREEMENTS AND CONTROL THE TRANSFER OF SENSITIVE TECHNOLOGY AND EQUIPMENT
- CONTROL THE DISSEMINATION OF CLASSIFIED INFORMATION

AUTHORITY

Chart 2

- ATOMIC ENERGY ACT OF 1954, AS AMENDED (TRANSFERRED TO DOE BY PL 95-91, "DOE ORGANIZATION ACT").
- ANNUAL "NUCLEAR WEAPON STOCKPILE MEMORANDUM," APPROVED BY THE PRESIDENT, DIRECTS SPECIFIC WEAPON BUILDS AND RETIREMENTS.

DOE – DEFENSE PROGRAMS
FY 1985 BUDGET REQUEST
SUMMARY OF FUNDING
($ IN MILLIONS)

Chart 3

PROGRAM COMPONENT	FY 1984	FY 1985
	BUDGET AUTHORITY	BUDGET AUTHORITY
WEAPONS ACTIVITIES		
RESEARCH, DEVELOPMENT & TESTING	$1,380.2	$1,723.2
INERTIAL CONFINEMENT FUSION	169.7	138.0
PRODUCTION & SURVEILLANCE	2,100.2	2,621.7
PROGRAM DIRECTION	57.5	60.2
SUBTOTAL	3,707.6	4,543.1
NUCLEAR MATERIALS		
MATERIALS PRODUCTION	1,535.9	1,864.2
DEFENSE WASTE & BYPRODUCTS MGMT.	681.1	752.8
SUBTOTAL	2,217.0	2,617.0
SECURITY AFFAIRS		
VERIFICATION & CONTROL TECHNOLOGY	61.7	76.7
SAFEGUARDS & SECURITY	52.0	62.7
SECURITY INVESTIGATIONS	29.5	34.0
SUBTOTAL	143.2	173.4
PROPOSED FY 1984 SUPPLEMENTAL	157.6	–
GRAND TOTAL DEFENSE PROGRAMS	$6,225.4	$7,333.5[a]

[a] EXCLUDES SAVINGS FROM MANAGEMENT INITIATIVES.

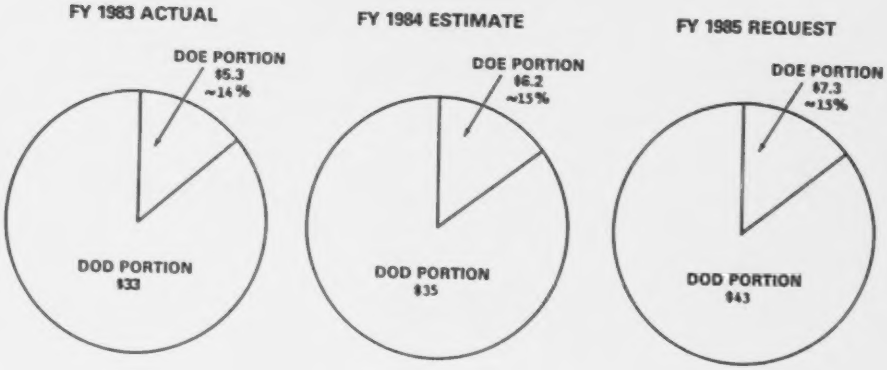
FY 1984 SUPPLEMENTAL REQUEST
SUMMARY OF FUNDING
($'s IN MILLIONS)

Chart 4

	FY 1983	FY 1984		
PROGRAM COMPONENT	BUDGET AUTHORITY	BUDGET AUTHORITY	SUPPLEMENTAL REQUEST	TOTAL
WEAPONS ACTIVITIES				
RESEARCH, DEVELOPMENT & TESTING	$1,183.6	$1,380.2	$ 29.1	$1,409.3
INERTIAL CONFINEMENT FUSION	189.7	169.7	–	169.7
PRODUCTION & SURVEILLANCE	1,918.0	2,100.2	36.5	2,136.7
PROGRAM DIRECTION	52.5	57.5	–	57.5
SUBTOTAL	$3,343.8	$3,707.6	$ 65.6	$3,773.2
NUCLEAR MATERIALS				
MATERIALS PRODUCTION	1,319.9	1,535.9	85.8	1,621.7
DEFENSE WASTE & BYPRODUCTS MGMT.	518.7	681.1	–	681.1
SUBTOTAL	$1,838.6	$2,217.0	$ 85.8	$2,302.8
SECURITY AFFAIRS				
VERIFICATION & CONTROL TECHNOLOGY	53.9	61.7	6.2	67.9
SAFEGUARDS & SECURITY	47.4	52.0	–	52.0
SECURITY INVESTIGATIONS	28.5	29.5	–	29.5
SUBTOTAL	$ 129.8	$ 143.2	$ 6.2	$ 149.4
GRAND TOTAL DEFENSE PROGRAMS	$5,312.2	$6,067.8	$157.6	$6,225.4

TOTAL NUCLEAR WEAPON SYSTEMS BUDGET — DOD AND DOE

(B/A $ IN BILLIONS)



DEFENSE PROGRAMS MISSION

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FY 1984 SUPPLEMENTAL REQUEST SUMMARY OF FUNDING

($'s IN MILLIONS)

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DEFENSE PROGRAMS

DOE — DEFENSE PROGRAMS
FY 1985 BUDGET REQUEST
SUMMARY OF FUNDING
($ IN MILLIONS)

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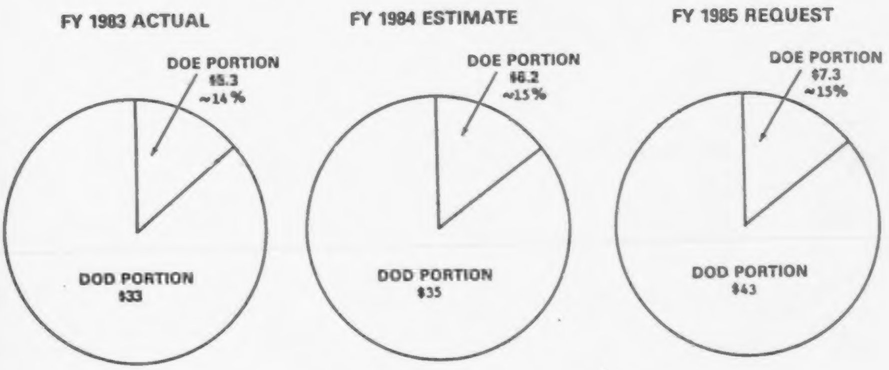
[a/] EXCLUDES SAVINGS FROM MANAGEMENT INITIATIVES.

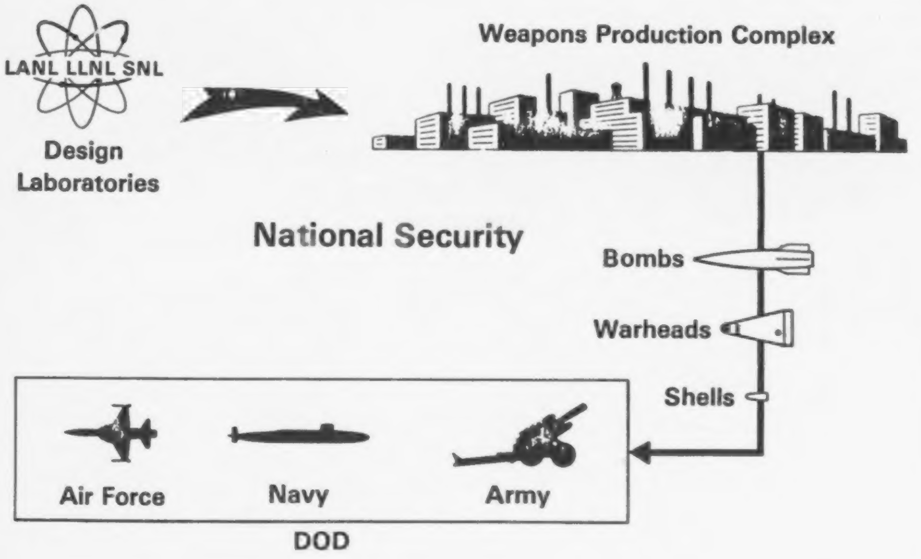
TOTAL NUCLEAR WEAPON SYSTEMS BUDGET — DOD AND DOE
(B/A $ IN BILLIONS)



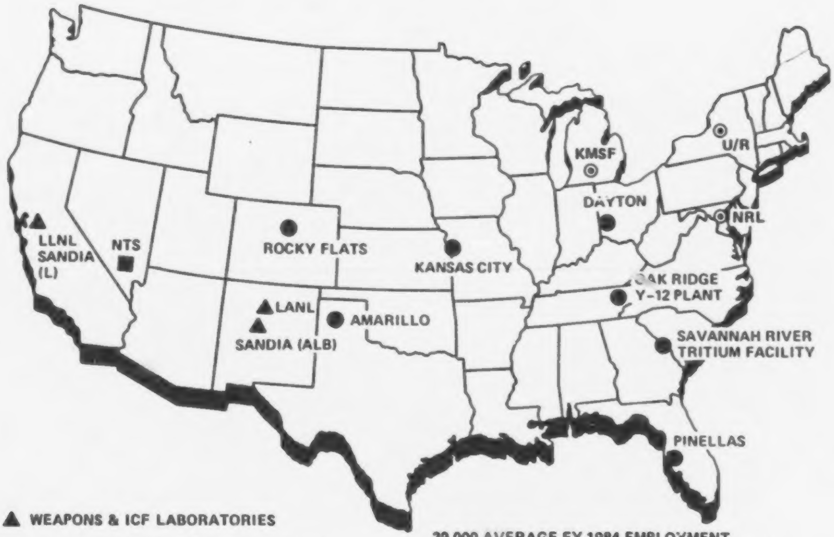
DEFENSE PROGRAMS — WEAPONS ACTIVITIES

WEAPONS COMPLEX

- HIGH TECHNOLOGY CORPORATION
- UNIQUE - SOLE SOURCE
- MAINTAIN MARGIN FOR NATIONAL SECURITY
- HEDGE AGAINST UNCERTAINTY
- MUST BE SAFE, SECURE, ENVIRONMENTALLY ACCEPTABLE


LANL LLNL SNL
Design Laboratories
Weapons Production Complex
National Security
Bombs
Warheads
Shells
Air Force
Navy
Army
DOD

DEFENSE PROGRAMS — WEAPONS ACTIVITIES


LLNL
SANDIA
(L)
NTS
ROCKY FLATS
KANSAS CITY
LANL
SANDIA (ALB)
AMARILLO
KMSF
U/R
DAYTON
NRL
OAK RIDGE
Y-12 PLANT
SAVANNAH RIVER
TRITIUM FACILITY
PINELLAS

▲ WEAPONS & ICF LABORATORIES
● WEAPONS PRODUCTION FACILITIES - MA
■ NEVADA TEST SITE
⊙ ICF SUPPORT CONTRACTORS

30,000 AVERAGE FY 1984 EMPLOYMENT
2,030 SQ. MILES OF LAND (ABOUT THE SIZE OF DELAWARE)
24 MILLION SQ. FT. FLOOR SPACE
250,000 ITEMS OF EQUIPMENT
$13 BILLION ESCALATED ACQUISITION COSTS IN FY 1985 DOLLARS

INVESTMENT STRATEGY FOR 1984 AND BEYOND

- MEET PRODUCTION NOW AND IN THE FUTURE

  DELETED

- INCREASE RD&T MANPOWER 15%
- INCREASE TESTING

  DELETED

- REVITALIZE AGING PLANT
  - RESTORATION
  - RD&T FACILITIES
- IMPROVE CERTAIN WEAPONS IN THE STOCKPILE
- PROVIDE MANAGEMENT AND MANUFACTURING FLEXIBILITY

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

FY 1985 CONGRESSIONAL SUBMISSION (B/A $ IN MILLIONS)

	FY 1983 ACTUAL	FY 1984 ESTIMATE	FY 1985 ESTIMATE AUTH.	FY 1985 ESTIMATE APPROP.
RESEARCH AND DEVELOPMENT	738.5	844.3	1,085.2	1,085.2
TESTING	446.9	565.0	638.0	638.0
INERTIAL CONFINEMENT FUSION	189.8	169.7	138.0	138.0
PRODUCTION AND SURVEILLANCE	1,916.8	2,136.7	2,604.6	2,621.7
PROGRAM DIRECTION	54.4	57.5	60.2	60.2
TOTAL WEAPONS ACTIVITIES	$3,346.4	$3,773.2	$4,526.0	$4,543.1

FY 1984 SUPPLEMENTAL	
• STATE SALES/USE TAX LIABILITIES	$37.6
• SAFEGUARDS AND SECURITY, VL	20.4
• ENVIRONMENT, HEALTH, AND SAFETY, Y-12	7.6
TOTAL WEAPONS ACTIVITIES	$65.6

PRODUCTION & SURVEILLANCE

Maintain, Produce, and Deliver Nuclear Weapons to the Stockpile

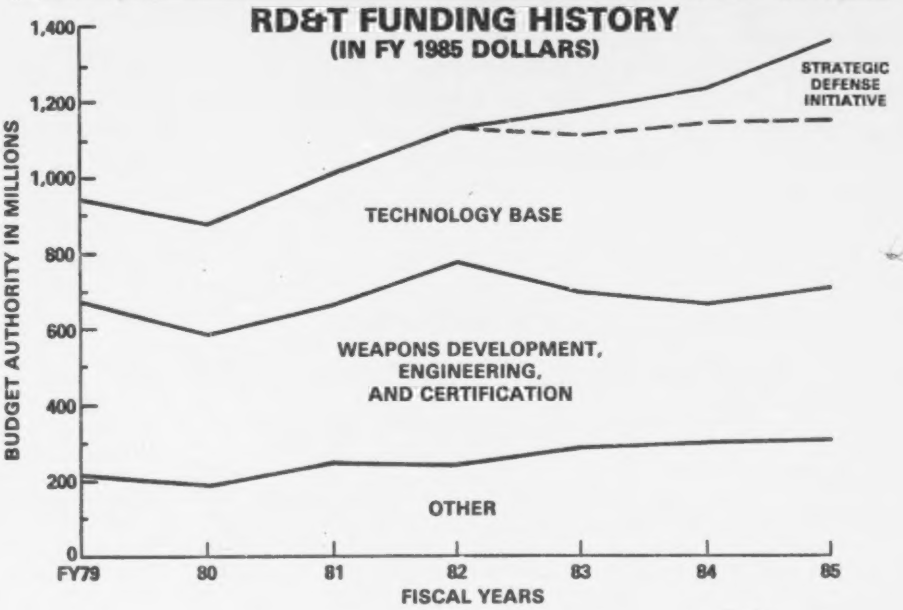
FY 1985 PRODUCTION AND SURVEILLANCE RESOURCES PROVIDE FOR:

DELETED

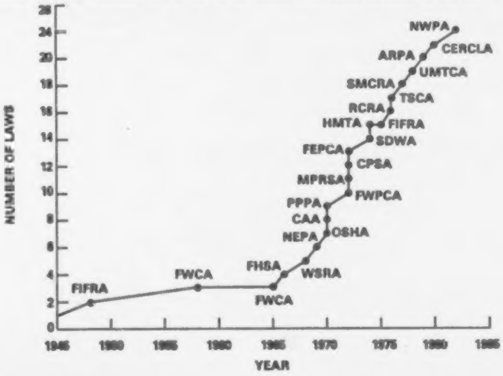
- REPAIRS, DISPOSALS, AND EXCHANGE OF LIMITED-LIFE COMPONENTS APPLICABLE TO THE EXISTING NUCLEAR WEAPONS STOCKPILE
- WEAPONS-RELATED TRANSPORTATION AND SAFEGUARDS ACTIVITIES
- FULL-SCALE PRODUCTION OF B61 BOMB, W76 TRIDENT MK4, W79 8-INCH AFAP, W80-0 SLCM, W80-1 ALCM, B83 BOMB, W84 GLCM, AND W85 PERSHING II
- PRODUCTION ENGINEERING AND LONG-LEAD PROCUREMENTS FOR THE W81 SM-2, W87 PEACEKEEPER, TRIDENT II, ADVANCED AIR-TO-SURFACE MISSILE SYSTEM, AND ASW/SOW

DELETED

DOE WEAPONS PROGRAM NEW CONCEPTS AND PROGRAM BALANCE



LEGISLATION RELATED TO ENVIRONMENTAL PROTECTION



FIFRA — FEDERAL INSECTICIDES, FUNGICIDE, AND RODENTICIDE (1948, 1972, 1975)
FWCA — FISH AND WILDLIFE COORDINATION (1958, 1965)
FHSA — FEDERAL HAZARDOUS SUBSTANCES (1966)
WSRA — WILD AND SCENIC RIVERS ACT (1968)
NEPA — NATIONAL ENVIRONMENTAL POLICY (1969)
PPPA — POISONIOUS PACKAGING PREVENTION (1970)
OSHA — OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA — CLEAN AIR (1970, 1977)
FWPCA — FEDERAL WATER POLLUTION CONTROL (NOW CLEAN WATER) (1972, 1977)
MPRSA — MARINE PROTECTION, RESEARCH, AND SANCTUARIES (1972)
CPSA — CONSUMER PRODUCT SAFETY (1972)
FEPCA — FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA — SAFE DRINKING WATER (1974, 1977)
HMTA — HAZARDOUS MATERIALS TRANSPORTATION (1974)
RCRA — RESOURCE CONSERVATION AND RECOVERY (1976, 1979)
TSCA — TOXIC SUBSTANCE CONTROL (1976)
SMCRA — SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTCA — URANIUM MILL TAILINGS CONTROL (1978)
ARPA — ARCHEOLOGICAL RESOURCE PROTECTION ACT (1979)
CERCLA — COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (1980)
NWPA — NUCLEAR WASTE POLICY ACT (1982)

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

PRESIDENT'S SPEECH — MARCH 23, 1983

"I AM DIRECTING A COMPREHENSIVE AND INTENSIVE EFFORT TO DEFINE A LONG-TERM RESEARCH AND DEVELOPMENT PROGRAM TO BEGIN TO ACHIEVE OUR ULTIMATE GOAL OF ELIMINATING THE THREAT POSED BY STRATEGIC NUCLEAR MISSILES"

INERTIAL CONFINEMENT FUSION
(Budget Authority in Millions)

	FY 1983	FY 1984	FY 1985
OPERATING EXPENSES	$140.0	$145.0	$125.0
CAPITAL EQUIPMENT	11.0	11.8	9.5
CONSTRUCTION	38.8	12.9	3.5
TOTAL	$189.8	$169.7	$138.0

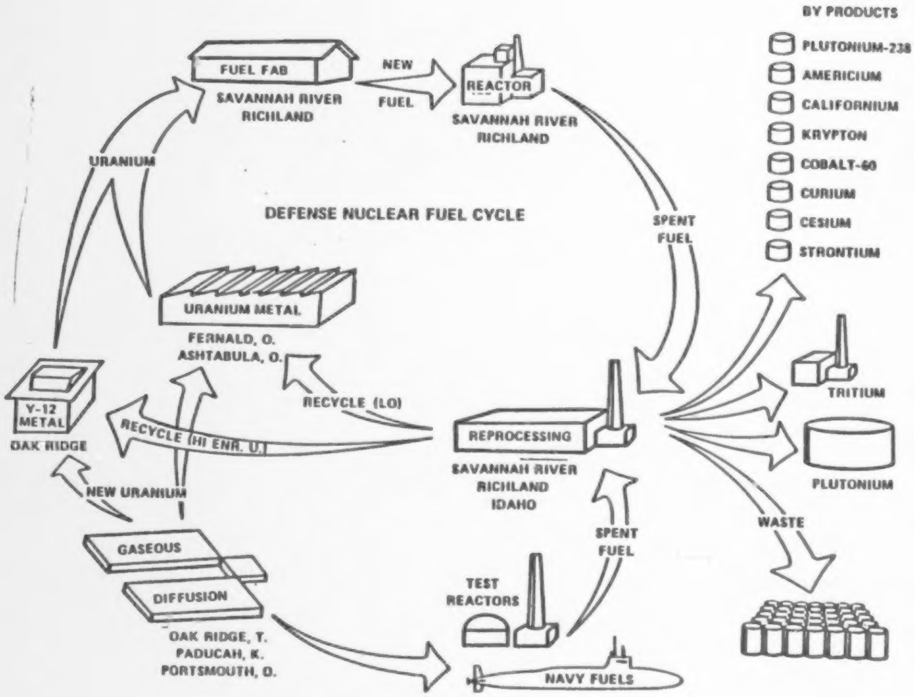
FY 1985 WEAPONS PROGRAM BUDGET SUMMARY

- THE BUDGET:
  - MEETS ALL NWSM REQUIREMENTS
  - SUPPORTS GROWTH IN STRATEGIC DEFENSE INITIATIVE
  - CONTINUES RESTORATION PROGRAM
  - CONTINUES FY 1984 TEST REVITALIZATION PROGRAM AND INITIATES RD&T PROGRAM
  - SUPPORTS LONG-TERM COMMITMENT TO ENVIRONMENT, SAFEGUARDS, AND SECURITY
  - SUPPORTS VIABLE ICF PROGRAM
  - CONTINUES STOCKPILE IMPROVEMENT PROGRAM

DEFENSE PROGRAMS—NUCLEAR MATERIALS

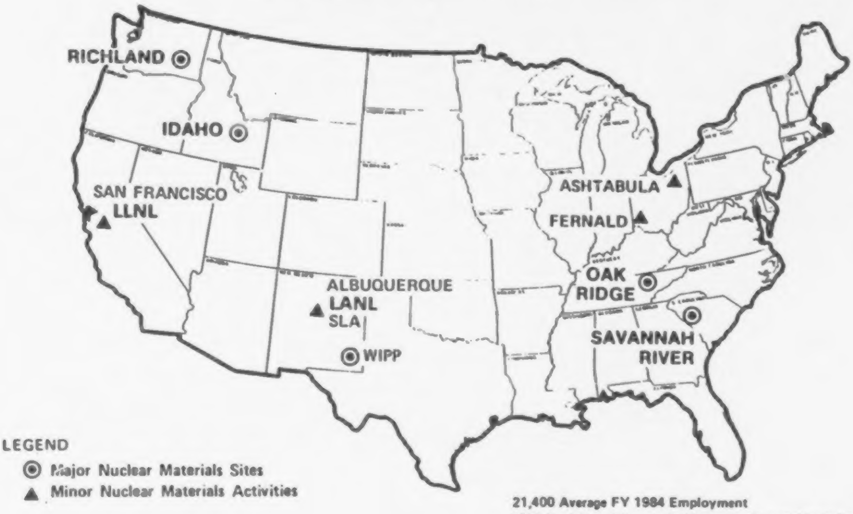
FY 1985 BUDGET REQUEST
(DOLLARS IN MILLIONS)

	FY 1984 APPROP.	FY 1984 SUPPLEMENTAL APPROP. REQUEST	FY 1985 APPROP. REQUEST
MATERIALS PRODUCTION	$1,535.9	$85.8	$1,864.2
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT	$ 681.1	$ 0.0	$ 752.8


BY PRODUCTS
PLUTONIUM-238
AMERICIUM
CALIFORNIUM
KRYPTON
COBALT-60
CURIUM
CESIUM
STRONTIUM
FUEL FAB
SAVANNAH RIVER
RICHLAND
NEW
FUEL
REACTOR
SAVANNAH RIVER
RICHLAND
URANIUM
DEFENSE NUCLEAR FUEL CYCLE
SPENT
FUEL
URANIUM METAL
FERNALD, O.
ASHTABULA, O.
Y-12
METAL
OAK RIDGE
RECYCLE (LO)
RECYCLE (HI ENR. U.)
REPROCESSING
SAVANNAH RIVER
RICHLAND
IDAHO
TRITIUM
PLUTONIUM
NEW URANIUM
WASTE
GASEOUS
DIFFUSION
OAK RIDGE, T.
PADUCAH, K.
PORTSMOUTH, O.
SPENT
FUEL
TEST
REACTORS
NAVY FUELS

DEFENSE PROGRAMS — NUCLEAR MATERIALS

NUCLEAR MATERIALS SITES


RICHLAND
IDAHO
SAN FRANCISCO
LLNL
ALBUQUERQUE
LANL
SLA
WIPP
ASHTABULA
FERNALD
OAK RIDGE
SAVANNAH RIVER
LEGEND
◉ Major Nuclear Materials Sites
▲ Minor Nuclear Materials Activities

21,400 Average FY 1984 Employment
1870 Sq. Miles of Land—1½ Times the Size of Rhode Island
$13.4 Billion—Escalated Acquisition Costs in FY 1984 Dollars

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
BUDGET SUMMARY
(DOLLARS IN MILLIONS)

	FY 1984 APPROP.	FY 1985 APPROP.
BASE ACTIVITIES		
CURRENT OPERATIONS	$ 933.6	$1,105.0
L REACTOR	64.5	65.0
PUREX	88.7	90.8
SECURITY	102.1	96.8
ENVIRONMENTAL	59.3	58.1
SUBTOTAL	$1,248.2	$1,415.7
PRODUCTION INITIATIVES		
RESTORATION	$ 107.6	$ 84.5
IDAHO RESTORATION	5.5	14.1
PRODUCTIVITY IMPROVEMENTS	25.3	50.7
MARK 15 CORES	4.0	113.5
SPECIAL ISOTOPE SEPARATION	71.9	39.0
PROCESS FACILITY MODIFICATION	12.5	0.0
REACTOR SAFETY	26.7	25.7
SUBTOTAL	$ 253.5	$ 327.5
OTHER		
NAVAL REACTOR SUPPORT	$ 120.0	$ 121.0
TOTAL MATERIALS PRODUCTION	$1,621.7	$1,864.2

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST

MARK-15 (SR CORES)

(Dollars in Millions)

	FY 1983 BA	FY 1984 BA	FY 1985 BA
MARK-15	$18.7	$4.0	$ 23.0
URANIUM ENRICHING	0	0	90.5
TOTAL	$18.7	$4.0	$113.5

- MARK-15 CORES INCREASE PU EQ. PRODUCTION *DELETED*
- UNIT COSTS OF PU *DELETED*
- FY 1985 FUNDING PROVIDES FOR PURCHASE OF SEU FROM GASEOUS DIFFUSION PLANTS, COMPLETION OF FACILITY STORAGE MODIFICATIONS, AND INITIATION OF PRODUCTION OF MARK-15 CORES AT OR AND SR
- PARTIAL CONVERSION OF SR REACTORS PLANNED FOR FY 1986

SPECIAL ISOTOPE SEPARATION PROGRAM SUMMARY

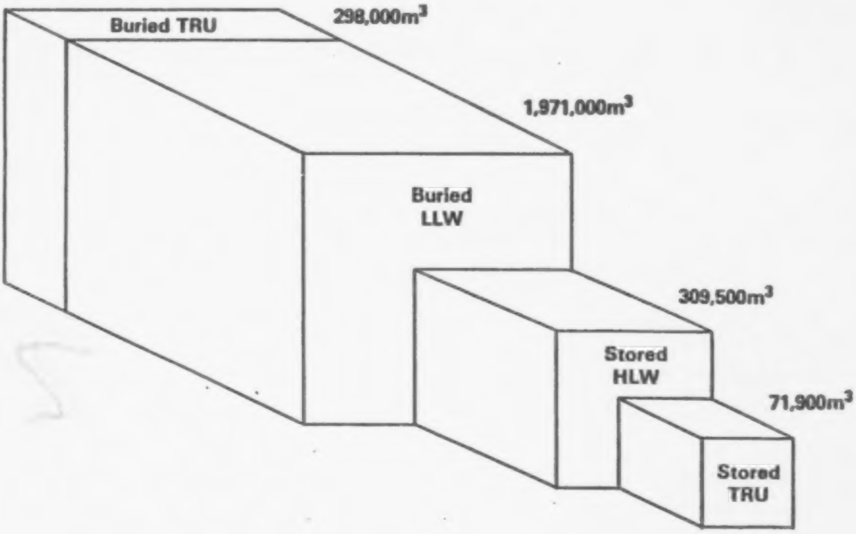
- AVLIS PROCESS SELECTED FOR PRODUCTION PROTOTYPE — FY 1983
- AVLIS FULL-SCALE SEPARATOR DEMONSTRATION — SPRING FY 1984
- DOE/OSTP TECHNICAL REVIEW — FY 1984
- AVLIS INTEGRATED EQUIPMENT PROCESS DEMONSTRATION — FY 1987
- PRODUCTION PROTOTYPE OPERATION — FY 1989 (ONE YEAR DELAY)
- FULL PRODUCTION CAPABILITY — FY 1991 (ONE YEAR DELAY)

NEW PRODUCTION REACTOR (NPR)

- NPR WOULD PROVIDE ASSURED SUPPLY OF TRITIUM VITAL TO MAINTAINING NUCLEAR WEAPONS STOCKPILE
- NPR STUDIES UNDERWAY TO SUPPORT REACTOR CONCEPT/SITE SELECTION BY MID FY 1985 FOR RECOMMENDATION TO PRESIDENT

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

Defense Waste Inventory



DEFENSE PROGRAMS
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT
FY 1985 BUDGET REQUEST
(BA IN MILLIONS)

	FY 1984 APPROP.	FY 1985 APPROP.
INTERIM WASTE OPERATIONS	$314.0	$329.0
LONG-TERM WASTE MANAGEMENT TECHNOLOGY	211.3	334.2
(DEFENSE WASTE PROCESSING FACILITY)	(159.8)	(267.7)
TERMINAL STORAGE (WIPP)	137.7	87.5
BYPRODUCTS AND BENEFICIAL USE	15.6	0
PROGRAM DIRECTION	2.5	2.1
TOTAL	$681.1	$752.8

BYPRODUCTS AND BENEFICIAL USE

- CESIUM 137 BENEFICIAL USE PROJECTS
  - ALBUQUERQUE MUNICIPAL SLUDGE IRRADIATOR
  - TRANSPORTABLE CESIUM IRRADIATOR
  - PORK IRRADIATOR
  - CESIUM AGRICULTURAL COMMODITY IRRADIATOR
- DEFENSE ENERGY PROJECTS
  - TRITIUM LIGHTING FOR MILITARY
  - DEFENSE TERRESTRIAL REACTOR
  - NORTH WARNING SYSTEM
  - 500 WATT THERMOELECTRIC POWER SUPPLY (STRONTIUM 90)

DEFENSE PROGRAMS – SECURITY AFFAIRS

SUMMARY
(BUDGET AUTHORITY IN MILLIONS)

FY 1984		FY 1985
$ 52.0	NUCLEAR SAFEGUARDS AND SECURITY	$ 62.7
(2.5)	CLASSIFICATION	(3.9)
29.5	SECURITY INVESTIGATIONS	34.0
67.9 *	VERIFICATION AND CONTROL TECHNOLOGY	76.7
$149.4		$173.4

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*INCLUDES $6.2 MILLION FY 1984 SUPPLEMENTAL REQUEST

SAFEGUARDS AND SECURITY

FY 1985 CONGRESSIONAL BUDGET REQUEST
DOE-WIDE CROSSCUT BUDGET
(Budget Authority in Millions)

	FY 1983	FY 1984	FY 1984 PROPOSED SUPPLEMENTAL	FY 1985
OPERATING EXPENSES	$317.1	$360.9	$20.0	$411.0
CAPITAL EQUIPMENT	26.3	33.7	–	30.1
CONSTRUCTION	29.7	47.7	44.3	132.7
TOTAL	$373.1	$442.3	$64.3	$573.8

DEFENSE PROGRAMS – SECURITY AFFAIRS
SAFEGUARDS AND SECURITY

MAJOR CONCERNS

- ENDANGERING PUBLIC HEALTH & SAFETY
- DISRUPTION OF THE NATION'S STOCKPILE
  - MAINTENANCE OF CURRENT STOCKPILE
  - NEW PRODUCTION

THREAT

- THEFT OF SNM OR UNAUTHORIZED CONTROL OF A NUCLEAR DEVICE
  - TERRORISTS
  - CRIMINALS
  - ANTI-NUCLEAR EXTREMISTS
- INDUSTRIAL & RADIOLOGICAL SABOTAGE
  - TERRORISTS
  - PSYCHOTICS
  - DISGRUNTLED EMPLOYEES
  - ANTI-NUCLEAR EXTREMISTS

DEFENSE PROGRAMS – SECURITY AFFAIRS
SAFEGUARDS AND SECURITY

DOE SAFEGUARDS AND SECURITY PLANNING AND PROGRAMMING

- THREAT
- SITE VULNERABILITY ASSESSMENTS
- SITE SAFEGUARDS AND SECURITY PLANS
- SENIOR MANAGEMENT REVIEW
- PROGRAM FORMULATION
- BUDGET FORMULATION
- INSPECTION AND EVALUATION

SAFEGUARDS AND SECURITY SITE PLANS REVIEW

o FIRST SYSTEMATIC REVIEW OF ALL DOE NUCLEAR FACILITIES

o GOOD FIRST EFFORT

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o ADDITIONAL EFFORTS REQUIRED

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DEFENSE PROGRAMS – SECURITY AFFAIRS

SAFEGUARDS AND SECURITY

MAJOR LESSONS LEARNED IN PAST YEAR

- CORPORATE COMMITMENT
- SECURITY EDUCATION & AWARENESS
- REDUCTION/CONSOLIDATION OF SNM INVENTORY
- DEFENSE IN-DEPTH
- CROSS FERTILIZATION AMONG FIELD OFFICES
- COST EFFECTIVENESS

MAJOR CONTINUING ACTIONS

- ➔ IMPLEMENTATION OF NSC DIRECTION
- ➔ AIRSPACE RESTRICTIONS
- OUTSIDE ASSISTANCE
- ➔ PHYSICAL FITNESS STANDARDS
- EXPANDED HUMAN RELIABILITY PROGRAM
- OPERATIONS OFFICE ANNUAL REPORTS
- SAFEGUARDS & SECURITY SITE PLANS
- SAFEGUARDS & SECURITY TRAINING ACADEMY
- ➔ EXPANSION OF INSPECTION & EVALUATION ACTIVITIES
- VULNERABILITY ASSESSMENTS
- DEFICIENCY/CORRECTION ACTION TRACKING SYSTEM

STATEMENT OF MAJ. GEN. WILLIAM W. HOOVER

INTRODUCTION

Mr. Chairman and Members of the Committee:

(Chart 1) It is my pleasure to appear before this Committee once again to discuss the Department of Energy (DOE) FY 1985 nuclear weapons and inertial confinement fusion programs and the funding necessary to carry out these programs.

In previous testimony I have drawn the analogy between the DOE nuclear weapons complex and a major, high-technology corporation. I would like to continue to do so. We are similar in that our corporate assets must be maintained and improved; our long-range planning must take into account economic and political issues as well as technological variables; and we must position ourselves for the future in an uncertain world. We are different in that our product line -- nuclear warheads -- is unique and we have but one customer, the Department of Defense (DOD). Most importantly, we are the sole source in the Nation for this product line. Were there to be an increased need for nuclear capabilities, we could not turn elsewhere because a private industrial base is not available. In that sense we are fundamental to national security, and I would caution that an adequate margin of both nuclear weapon production and research and development capacity must be maintained as a hedge against such a need. Our primary goal is to run the business efficiently, safely, and in an environmentally sound manner while ensuring the highest measure of safeguards and security. We realize there are disparate views about nuclear weapons. Whatever their views, our citizens have the right to be assured that, so long as we maintain a nuclear stockpile, the weapons and the facilities required for their design and production are safe, secure, and environmentally acceptable.

(Chart 2) This is a time when the nuclear weapons program must be able to accommodate change and new ideas. The world events of the past year will affect our program directly or indirectly, both now and in the future. The nuclear freeze, arms control, and build-down proposals; the United States relationship within the North Atlantic Treaty Organization (NATO), the deployment of both the Pershing II and Ground-Launched Cruise Missile (GLCM) systems, and the issue of conventional versus nuclear battlefield weapons; the global effects of nuclear war, and the President's initiative on strategic defense all impact nuclear weapons research and development.

(Chart 3) The primary purpose of our nuclear weapons is to deter a nuclear or major conventional attack against the United States or its allies. To deter such an attack, we maintain a stockpile of various types of nuclear weapons. We are continually replacing and modernizing rather than merely increasing the number of weapons in this stockpile. We have incorporated features such as insensitive high-explosive, and *DELETED* which significantly reduce the chance of an explosion or dispersal of nuclear material in an abnormal environment such as an aircraft crash. Additional command and control features have also been included to prevent unauthorized personnel from using the weapons. This modernization of older weapons, together with new production, has enabled the United States to counter the nuclear buildup by the Soviets during the last 20 years.

(Chart 4) Our investment strategy to provide a strong viable nuclear weapons complex as a linchpin of our nuclear deterrence guides us into the 1990s by ensuring sufficient manufacturing capacity to meet the current and planned production workload with some backup capability; enhancing capability in our national laboratories; increasing nuclear testing *DELETED* *DELETED* ; restoring and revitalizing the physical plant; maintaining an effective stockpile improvement program; employing modern management and manufacturing techniques to meet the challenges of the 1980s and 1990s; and ensuring that the nuclear weapons complex is environmentally sound and that safety and security are of continuing primary concern.

I would like now to describe how this complex works; what we build; how we carry out our research, development, testing, and production responsibilities; and to review some new concepts that hold promise for the future.

ASSETS

(Chart 5) This chart gives you an idea of the national scope of the nuclear weapons complex with major facilities located in 10 states and with an average FY 1984 contractor employment of about 39,000. In these government-owned, contractor-operated facilities, there is a great diversity of equipment, including computer-controlled, automated machinery to increase productivity and reverse the trend toward obsolescence.

(Chart 6) Unique capabilities are required to design, test, and manufacture United States nuclear weapons. The nuclear weapons complex includes three design laboratories, the Nevada Test Site (NTS), and seven production facilities. Of the three laboratories, the Los Alamos National Laboratory (LANL) and the Lawrence Livermore National Laboratory (LLNL) are responsible for nuclear design and the Sandia National Laboratories (SNL) are responsible for ordnance engineering. All three are broad-based, multiprogram laboratories with unique capabilities in the physical sciences and in engineering.

(Chart 7) The NTS is the only location where we currently conduct nuclear explosions. All these tests are conducted underground in accordance with the provisions of the Limited Test Ban Treaty and the 150 kiloton (kt) yield limit of the Threshold Test Ban Treaty.

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(Chart 8) The seven production facilities are located throughout the country and operate as an integrated industrial complex with all facilities responsible for production of specific weapon parts or components but only one facility responsible for final assembly.

(Chart 9) A comparison is often made between the nuclear weapons production complex and a large industrial organization. We do, indeed, share many similarities with industry in the private sector, but on closer examination we also find dissimilarities -- dissimilarities that make the production complex unique. They arise as the result of technical factors, such as special materials and processes which are unavailable in private industry, and the necessity for stringent security standards. We also must operate at the frontier of high technology and in hazardous environments. This chart shows some examples of how we have begun to use the latest technological advances to handle hazardous materials such as plutonium and to produce weapons components that meet extremely demanding specifications.

PRODUCT

(Chart 10) In the broadest sense, our product is new ideas, techniques, designs, and processes from our research and development laboratories and fully assembled warheads from our weapons production complex.

(Chart 11) Productivity increases continue to be a top management goal throughout the weapons complex. The effort involves both design and production elements. The investment made in restoration of the production facilities and acquisition of state-of-the-art capital equipment is increasing our ability to manufacture and design warhead components more economically, while refining manufacturing processes so as to decrease warhead costs. We have introduced extensive and detailed reviews, beginning at the subcomponent level, to insure that design intent is accommodated within the most cost effective manufacturing processes available. We have also established a formal mechanism with the DOD for commenting on the cost and producibility of weapons features with a view toward further reducing weapons system costs. Because of these and other actions, the trend in our index of productivity has been positive, resulting in a lowered, cost per nominal warhead produced. We expect this trend to continue as our use of computer-aided design/computer-aided manufacturing (CAD/CAM), robotics, and flexible machining systems increases within the complex.

The nuclear weapons presently being developed or produced, and for which FY 1985 funds are requested, can be divided into four distinct mission categories -- Strategic, Long-Range Theater, Battlefield, and Fleet Defense.

STRATEGIC WEAPONS

(Chart 12) The strategic warheads in development or production are the W76 warhead for the Trident I Submarine-Launched Ballistic Missile (SLBM), the W80-1 warhead for the Air-Launched Cruise Missile (ALCM), the B83 Strategic Bomb, the W87 warhead for Peacekeeper, and the warhead for the Trident II SLBM.

Production of W76 warheads is progressing

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Deliveries of W80-1 warheads for the ALCM began in FY 1982, and these missiles are now standing alert on B-52 bombers in the continental United States.

(Chart 13) The B83 Strategic Bomb went into production in June 1983. It is intended to replace the present B28 and B43 bombs which were developed in the 1950s. It incorporates the latest advances in nuclear weapons safety, DELETED and multiple-delivery and fuzing options. The B83 is compatible with the B-52 and FB-111 aircraft of the Strategic Air Command and will also be compatible with the B1-B.

The W87 warhead for Peacekeeper will be in production engineering in FY 1985 with an initial operational capability (IOC) date of December 1986. The $20.9 million in the budget request will complete the DOE total estimated cost (TEC) capital funding for the W87. This warhead is also being considered as the baseline design for the small mobile Intercontinental Ballistic Missile, the so-called "Midgetman," recommended by the Scowcroft panel.

(Chart 14) We are just beginning engineering development of the warhead for the Trident II SLBM. A new, high-yield warhead and reentry body are being developed for the more powerful D5 missile that will be carried on Ohio-class Trident submarines. The Trident II system will have an IOC date of December 1989.

LONG-RANGE THEATER

(Chart 15) In the long-range theater category, we have one bomb and three warhead programs in progress.

B61-3 and -4 bombs are lightweight tactical bombs with *DELETED* *DELETED* multiple-delivery and fuzing options.

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(Chart 16) The W80-0 warhead for the Sea-Launched Cruise Missile (SLCM) is the same warhead (with only minor differences) as the W80-1 ALCM warhead, thus avoiding a costly and time-consuming separate development effort. Quantity production is scheduled to begin in March 1984, and the IOC date is June. The SLCM will be capable of launch from both submarine and surface vessels and is for use against land targets.

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The W84 warhead is used in the GLCM. It incorporates enhanced safety and security features such as insensitive high-explosive, *DELETED* , a mechanical safing and arming device, *DELETED* *DELETED* and a command disable system to prevent unauthorized use. *DELETED*

The W85 is the warhead for the Pershing II (PII) missile which is presently being deployed with United States forces in Germany as a replacement for the Pershing IA (PIA) missile. *DELETED* *DELETED* It incorporates insensitive high-explosive and enhanced electrical safety features, enhanced security features *DELETED*

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BATTLEFIELD NUCLEAR SYSTEMS

(Chart 17) The only battlefield nuclear system presently in production is the W79 warhead for the 8-Inch Artillery-Fired Atomic Projectile (AFAP). This AFAP, which has an enhanced radiation capability, entered production in 1981. It presently is being stored on United States soil pending receipt of authority from the President to deploy it to NATO. The W79 is intended to replace the W33 8-Inch AFAP (first entered the stockpile in 1951)

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I wish to bring to your attention the fact that we have not requested any funds for the W82 155mm AFAP. Enactment of the FY 1984 DOD Authorization Act in September 1983 and the accompanying House and Senate Report directed the DOD to terminate the W82 program. Enactment of the FY 1984 Supplemental Appropriations Act in November 1983 rescinded the $50 million previously appropriated to the DOE for construction of 155mm AFAP production facilities, and cited the action as being consistent with the action taken in the FY 1984 DOD Authorization Act to terminate the program. We have informed the DOD that we are instituting an orderly phasedown of the program which will result in its termination by the end of FY 1984. We stand ready to restore the W82 program if and when directed.

FLEET DEFENSE

(Chart 18) The W81 is the warhead for the Navy's Standard Missile-2 which is employed on a variety of guided missile cruisers and destroyers. The weapon system is primarily intended for defense against high-altitude, supersonic, nuclear cruise missiles.

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(Chart 19) The DOE is presently conducting a design definition and cost study (Phase 2A) for a new nuclear depth bomb for the submarine-launched, antisubmarine warfare/standoff weapon (ASW/SOW) system.

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there will be only a short development period. Although the warhead for the ASW/SOW is not expected to enter development engineering (Phase 3) until late 1985 or early 1986, the early selection of a warhead design will enable the DOE to develop the nuclear depth bomb and field a realistic payload for the flight tests.

FY 1985 BUDGET

(Chart 20) The weapons activities budget request of approximately $4.5 billion shown in this chart supports three major areas -- weapons research, development, and testing; inertial confinement fusion; and production and maintenance of nuclear weapons. Allocation of these funds in FY 1985 may, however, be dependent upon approval of the FY 1984 supplemental budget request of $65.6 million. Of this amount, $37.6 million is for payment of taxes imposed on the government-owned, contractor-operated nuclear weapon facilities located in the States of Colorado, Missouri, Nevada, New Mexico, and Ohio. The legal standing of these liabilities was decided by last year's Supreme Court ruling which upheld New Mexico's claim that it had the right to impose a gross receipts tax on DOE contractors. The remaining $28 million in the FY 1984 supplemental request is for various safeguards and security, and environmental, health, and safety projects.

Without the requested supplemental funding for payment of these taxes in FY 1984, the Weapons Program will be compelled to absorb this unbudgeted expense by reducing program activities. This expense is beyond the control of the Department and must be paid in the normal course of business beginning with FY 1984. Accordingly, without supplemental funding, the Department will be required to defer procurements, employment, and other key activities that support the research, development, testing, and production of nuclear weapons. In addition, in order to support DOE schedules to the DOD for those essential nuclear weapons, maintenance activities, procurements, and delivery schedules for selected nuclear weapons were delayed in order to live within the FY 1984 appropriation for weapons production and surveillance activities. Funding is included in the FY 1985 budget request to preclude future disruption of operations throughout the production complex.

PRODUCTION AND SURVEILLANCE

(Chart 21) This chart shows the deliveries to the DOD of nuclear weapons projected in the latest Nuclear Weapons Stockpile Memorandum (NWSM) approved by the President. It shows the DELETED in production rates and number of warhead systems, but it does not show the increased sophistication and complexity of these systems entering production. The task of producing many different warheads at the same time tends to push the weapons production complex to the limit in order to deliver a quality product on schedule.

(Chart 22) The major portion of this budget request -- over $2.6 billion -- is to produce nuclear warheads, maintain them, certify their reliability, and disassemble and properly dispose of them. The guidance for when we perform these activities is contained in the NWSM.

The FY 1985 budget request provides for operation and maintenance of the seven plants which manufacture components and assemble nuclear weapons. This includes production of new war reserve weapons, lifetime surveillance and maintenance of the weapons stockpile, process development to prepare for new designs and improved technology, retirement and disposal of warheads, and a stockpile improvement program to modernize certain older weapons currently in the nuclear stockpile.

Last year three new warheads were introduced on schedule: the B83 bomb, the W84 warhead for the GLCM, and the W85 warhead for the Pershing II Missile. This was a major achievement that taxed the resources of our production complex to their fullest. These new starts bring the total number of systems in production to nine (not including the B28 Stockpile Improvement Program (SIP) and the W68 warhead retrofit). With this large number of different systems in production, it would be impossible for us to meet the current or projected production schedule without continuing increases in productivity. These are being achieved by improving manufacturing techniques, the use of new materials, and more efficient scheduling.

(Chart 23) CAD/CAM equipment and techniques will be employed extensively in the production of the W81 warhead and the W87 Peacekeeper. In addition, we initiated a cost saving related to submarine missile warhead planning.

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Another important activity initiated in FY 1983 was a study of the capability and capacity of the nuclear weapons production complex. We wanted to assure ourselves that the production complex has sufficient reserve capacity to accommodate sudden increases in workload and to recover from disruptions or shutdowns of key facilities.

We are presently evaluating economically feasible actions to provide a modest measure of backup production capability in order to preclude cessation of deliveries in the event of a natural or manmade disaster at one facility or in one process.

(Chart 24) Of the $2.6 billion requested for production and surveillance, almost $540 million is for construction. New construction projects include tactical bomb production facilities at various locations, safeguards and site security upgrades, environmental improvements, and three production support projects. The remaining construction funds are required to continue projects authorized in prior years and the restoration program, about which I will talk more later.

RESEARCH, DEVELOPMENT, AND TESTING

(Chart 25) The foundation of our nuclear weapons research, development, and testing (RD&T) program consists of the people and facilities at our three weapons laboratories -- Los Alamos, Lawrence Livermore and Sandia National Laboratories. As their names imply, these institutions are truly national assets. While their primary mission is nuclear weapons oriented, the laboratories' broad technical expertise is being applied to a wide variety of other national security problems as well. For example, under the sponsorship of the DOD, the weapons laboratories are becoming increasingly involved in nonnuclear work including cooperative research and development programs on nonnuclear military technology with the Army and with the Office of the Secretary of Defense. Weapons RD&T funding maintains in the laboratories and at the NTS the capability to meet future requirements for the strategic arsenal and ensures our ability to make weapons if required. A strong, healthy RD&T program is essential to ensure that our nuclear stockpile does not become obsolete. At the same time, continued emphasis on RD&T guards against technological breakthroughs by our adversaries that could seriously degrade the stockpile's deterrent value. Let me provide you a few examples of the weapons laboratories' capabilities:

- Nuclear weapons technology remains the primary mission of these laboratories and supports our deterrent forces.

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- High-energy beam technology, including sources, storage technology, switching, beam formation and control, and propagation has been, for many years, an area of emphasis in the weapons laboratories.

  Materials sciences, surface science, and fabrication technologies which are pushed to new frontiers by the specialized demands of nuclear weapon design.
- High explosive technologies, essential to the development of compact and safe nuclear explosives; the DOE weapons laboratories have established world preeminence in this area.

Very large-scale computer modeling was pioneered in the United States nuclear weapons program; the weapons laboratories have capabilities in this field that are unparalleled in the world.

The lead in high-speed scientific computers, which the United States enjoys, is in large part driven by the need for a more powerful computational capability to improve nuclear weapon design. Large, scientific computers are essential for the design of modern nuclear weapons and present computers at the laboratories are being used to capacity. The growth in computing demand is due in large part to new weapon concepts with potential defensive applications, and we expect that this demand will continue over the next few years. We need to continue to obtain the best and most capable computers for use in the nuclear weapons research and development laboratories.

(Chart 26) Because of this lead in scientific computers, one of our national laboratories recently accomplished a successful transfer of technology to private industry. Under the S-1 computer project, jointly funded by the Navy and the DOE, LLNL developed and used automated computer design software called Structured Computer-Aided Logic Design (SCALD) in the program to design the advanced supercomputer system, now under construction. This software has been made available to interested commercial, academic, and government users. In fact, several companies have sprung up specifically to market SCALD and assist in its implementation by users, and it appears that this laboratory effort is bringing about a significant change in computer design methods.

(Chart 27) Underground nuclear testing is an integral part of the overall research and development process. Nuclear tests serve not only to confirm the soundness of weapon designs but also to perform important scientific experiments. These experiments enhance our understanding of the behavior of matter and energy at extreme temperatures and pressures and enable us to investigate new weapon concepts.

(Chart 28) As we move toward the 1990s the design and, hence, the testing of nuclear weapons become more complex, with each design and test requiring more laboratory resources than ever before.

In particular, the underground tests are more complex because of the need for increased data from each experiment. This need is a result of the more complex physics involved in design of advanced devices as well as the fact that more sophisticated modeling capability demands increased physics understanding.

(Chart 29) With the support of the Congress, we have turned around the decline that occurred in the 1970s in our weapons laboratories' resources to fulfill their primary mission -- the design and testing of nuclear weapons. As shown on this chart, we have also increased the emphasis on the all important technology base during the last several years.

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(Chart 30) For RD&T operating funds, the FY 1985 request is about $151 million higher than in FY 1984. This differential is made up of about $65 million to cover a 5 percent estimated cost escalation and about $86 million for real growth in the RD&T program. Most of this real growth will be devoted to technology base research in response to the President's Strategic Defense Initiative.

STRATEGIC DEFENSE INITIATIVE

(Chart 31) The President proposed a different approach to national security last March when he directed a study of defensive technologies as a means to enhance security and stability by eliminating the threat of ballistic missiles. The resultant technology and policy study recommended a broad-based but focused R&D program that would permit future decisions regarding deployment of a defensive system.

(Chart 32) The objective of the Strategic Defense Initiative program is to develop and demonstrate key technologies associated with concepts for defense against ballistic missiles. The objective of the DOE portion of the Strategic Defense Initiative program is to establish the technical feasibility of certain nuclear technology and to determine its applicability to development of a strategic defense system. We regard this effort as extremely important to national security and are working closely with the DOD, which is the lead agency for this initiative.

(Chart 33)

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This research is a broad-based effort which is an integral part of our nuclear weapons technology base activity. The relevant technologies have been funded previously within our RD&T activity, and we believe that this FY 1985 budget request is an appropriate level of effort. However, additional growth in employment *DELETED* may be required in the future to place proper emphasis on these concepts and maintain support for traditional RD&T activities. In addition, work continues within the technology base on more traditional nuclear weapon technologies that could have application to a strategic defensive system.

(Chart 34)

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The potential application of our nuclear, directed-energy weapon concepts to an eventual strategic defense system is sufficient reason for pursuing this research; however, there is an additional reason as well. In recent years, we have seen that the Soviets are well aware of the specific lines of approach to defensive strategic technologies that our scientists have also identified. We dare not neglect these areas and risk technological surprise.

INERTIAL CONFINEMENT FUSION

(Chart 35)

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Laser and particle beam inertial fusion drivers permit repetitive laboratory experiments and a high rate of data acquisition in some areas of weapons physics.

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For FY 1985 we are requesting for inertial fusion research and development a total of $138 million, of which $3.5 million is construction funding to complete the Particle Beam Fusion Accelerator II (PBFA II) at Sandia. This is in accordance with our program plan -- to complete and operate the three large facilities before making major future commitments in this program. Most of our request -- $125 million - is for operating funds for the three driver approaches -- gas lasers, glass lasers, and pulse power machines -- *DELETED* I would like to bring you up to date quickly on these efforts.

(Chart 36) At Los Alamos we have just brought into operation the ANTARES carbon dioxide laser system. ANTARES will be used to evaluate several fusion target concepts applicable to long wavelength laser drivers as well as to develop an improved understanding of other laser-plasma interactions pertaining generically to inertial fusion implosions. The evaluation of the utility of carbon dioxide lasers for inertial fusion applications in the ANTARES facility will be completed in FY 1985. We are requesting $30 million for gas laser experiments -- that is, experiments using ANTARES,

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(Chart 37) By the end of 1984, the NOVA laser facility at Livermore will be in operation, at about twice the energy of ANTARES and at a much shorter wavelength. NOVA experimental results, DELETED are expected to provide verification of predicted scaling of inertial fusion target physics to ignition and burn. During the past year, two beams of NOVA assembled in the former ARGUS laser facility have provided verification of favorable scaling of target implosion phenomena to high energies and supported directed-energy weapon research through experiments to measure X-ray laser kinetics.

The short wavelength laser target experiments effort is supported by work at KMS Fusion, the University of Rochester, and the Naval Research Laboratory. We regard these support laboratories as an important element in the national inertial fusion program. Each has unique qualities and provides opportunities for investigating alternative technical approaches that would not otherwise be readily available. The present program plan provides for continued participation of the support laboratories at approximately the FY 1984 level of effort. We are requesting $74 million in FY 1985 for glass laser experiments on NOVA, DELETED DELETED and supporting research based on glass lasers.

(Chart 38) The third element in this program is the pulse power work at Sandia, in which we are building the PBFA II that is scheduled to be completed in 1986. Current experiments on PBFA I, the predecessor facility, are expected to demonstrate production and propagation of beams of lithium ions for eventual target experiments on PBFA II. We are requesting $19.8 million in FY 1985 for pulse power.

(Chart 39) The program plan for inertial fusion is to complete the construction of the major facilities (NOVA, ANTARES, and PBFA II) and carry out target experiments as a basis for making an inertial fusion program decision in 1987. The FY 1985 budget would complete construction funding of the third facility, PBFA II. We are also requesting the minimum funds we need for experiments using each of these driver approaches in support of planned technical evaluations by 1987.

(Chart 40) There are certain crosscutting functions, about which I would like to speak, which are basic to the nuclear weapons complex. These are restoration and revitalization, environmental protection, and safeguards and security.

RESTORATION AND REVITALIZATION

(Chart 41) There are two areas vital to a modernized nuclear weapons complex -- one is the restoration program and the other is the revitalization program.

The restoration program was established to redress the impact of underfunding for general plant projects and capital equipment during the decade of the 1970s. The program was initiated in FY 1980 as a five-year funding effort to bring the nuclear weapons complex capital asset base up to modern standards. This chart shows the progress thus far in the restoration effort. Although originally conceived as a five-year program, it has been stretched to nine years with a projected cost of $3.5 billion. The solid line shows the nine-year plan on which the FY 1985 budget request is based. The dots display the cumulative funding through FY 1985 including the $175.1 million for the restoration project included in this budget request. With your support real progress is being made, despite the delay in funding.

If the completion of the restoration program is not to be further delayed, funds requested in the FY 1985 budget must be provided.

The current restoration project now has a TEC of $1,178.1 million in FY 1985 dollars. To date, $616.4 million has been appropriated through FY 1984 for the restoration project. To slow the ongoing deterioration, the FY 1985 budget also includes $31.6 million for RD&T General Plant Projects, $32.2 million for production and surveillance (P&S) General Plant Projects, $97.9 million for RD&T basic capital equipment, and $115.4 million for P&S basic capital equipment. The basic capital equipment for RD&T and P&S does not include funding for computers.

(Chart 42) I would now like to turn our focus to the RD&T facility revitalization. The nuclear weapons RD&T program is made up of a complex set of activities dependent on advanced technology facilities and equipment to support the accomplishment of our mission. In turn, the successful performance of the RD&T program contributes directly to the quality and reliability of the nuclear weapons stockpile. New systems require, in addition to the most stringent requirements for reliability and performance, new safety and safeguards features and functional life ranging up to 25 years. Without providing the facilities and equipment necessary for this RD&T effort, the United States risks losing its superiority in nuclear weapons technologies and delaying development of the strategic defense initiative.

Recognizing the need and cost effectiveness for technologically advanced facilities, we initiated a facilities revitalization program which would provide a major infusion of construction funds over the next several years to assure the adequacy of the capital asset base to support the overall objectives of the weapons RD&T program. This initiative is aimed at achieving a long-term, balanced test program, and sustaining a healthy R&D program to support existing weapon systems, developing future weapons, and exploring new concepts and defensive technologies.

The funding request of $91.5 million for FY 1985 represents the second increment of a multiyear program which will be used to fund the most urgent requirement of the three weapons laboratories and NTS.

ENVIRONMENTAL PROTECTION, SAFEGUARDS, AND SECURITY

(Chart 43) The nuclear weapons complex is faced with some problems in the area of environmental protection, which have received both local and national attention. I would like to describe the environmental problems, particularly at Oak Ridge, and tell you what we are presently doing and proposing to do to remedy these.

DOE's Oak Ridge complex consists of facilities primarily at three sites on the DOE reservation. The Y-12 Plant's primary mission is production of nuclear weapons components. Activities at the Y-12 Plant were initiated in the 1940s under wartime priorities aimed at developing an atomic weapon. These activities continued into the 1950s, during which there was a lack of detailed knowledge of the environmental impact of many of the materials used. Similarly, there was no significant national focus at that time on environmental protection and, therefore, minimal regulations or guidance at (Chart 44) the state and national level. As shown in the chart, there was little environmental legislation until the mid-1960s, and many of the environmental problems which we are encountering today stem from our activities prior to this. During the 1960s, with improving technical knowledge, important progress was made in upgrading operations at Oak Ridge, particularly with respect to radioactive waste burial practices. While this improvement continued into the 1970s, its pace did not match the development of a national commitment to the environment, the establishment of governmental oversight bodies, and the rapid development of more restrictive laws and regulations.

Environmental characterization and upgrading have been in progress at the DOE Oak Ridge reservation for years. However, recent inspections by the Environmental Protection Agency and the state have emphasized the need to accelerate environmental compliance activities on a more comprehensive basis.

(Chart 45) Numerous initiatives have been made over the past two years to bring the present Y-12 Plant operations into compliance with the various environmental regulations and to meet our obligations to the binding legal agreements with the state. FY 1984 construction costs for environmental improvements at the Y-12 Plant total $8.6 million. This includes $7.6 million in FY 1984 supplemental funding. Requirements for FY 1985 construction total $27.8 million.

(Chart 46) More difficult to solve than the environmental problems associated with present production at the Y-12 Plant are those resulting from past waste management practices. These are more difficult to define, requiring extensive record research, field testing and monitoring, and development of new technologies before any long-term remedial actions can be undertaken. As a result of our environmental experience at the Y-12 Plant and other facilities, Defense Programs is taking steps to assess the environmental posture of all of our facilities and determine what corrective actions are needed. Over the past year, we have initiated several actions to deal with this issue:

1. Specific guidance has been developed to address environmental legislation and regulations.
2. A long-range environment, safety, and health (ES&H) program plan is being prepared.
3. An ES&H Resource Group, made up of experienced professionals from the field offices and contractors of the weapons complex, has been formed to provide management with technical guidance and recommendations on environmental issues.

in this important environmental area, I wish to emphasize our commitment to operating our facilities within the established environmental regulations and to minimize any actual or potential risk to public health from those operations.

(Chart 47) I would now like to discuss another area of major concern within the weapons complex -- that of safeguards and security. With an increase in activities by international terrorists and anti-nuclear extremists, we became concerned as to whether the nuclear weapons complex was adequately protected. As a result, two years ago we established a working group to evaluate our safeguards and security posture and develop a long-range plan for safeguards and security throughout the weapons complex.

(Chart 48) Several improvements in equipment and facilities have already been instituted. Examples include installation of new intrusion detection systems, armed guard towers, additional fences with reinforced concrete barriers, and improved control and command centers. Our security forces are being equipped with new weapons to increase their fire power, additional armored response vehicles, and helicopters to provide emergency response capability.

(Chart 49) Even with the new equipment and security additions, the effectiveness of our safeguards and security program is still a function of how well our security forces perform. Additional response training exercises have been instituted at our facilities to include coordination with local law enforcement agencies. At many of our sites we have developed special response teams, trained to effectively deal with violently aggressive forces. We have also implemented a program that dictates the required physical fitness of our security forces.

(Chart 50) The FY 1984 supplemental budget request includes $20.4 million for five major safeguards and security projects, and the FY 1985 budget contains a request for $80.5 million to continue eight prior-year projects and to initiate eight new starts. We will continue to look at all site-by-site vulnerabilities DELETED

DELETED We are dedicated to taking whatever actions are necessary to assure the security of our weapons production inventories, our facilities, and the nuclear warheads in our custody.

SUMMARY

(Chart 51) In summary, our production capability and capacity, although stressed, have kept pace with scheduled warhead deliveries. However, when we produce 8-10 different state-of-the-art systems, with all the risks inherent in a success-oriented program, a problem in one weapons system tends to impact other systems. We need the flexibility to solve unanticipated problems without interfering with scheduled production and, at the same time, accommodate new concepts. Somehow this flexibility must be factored into the weapons development process if we are to remain in the forefront on nuclear weapons and new concepts development into the 21st century. We will be able to meet our near-term workload, but the outyears will be more difficult.

For these reasons, we believe it is imperative that the FY 1984 budget supplemental for weapons activities be approved. The FY 1984 supplemental budget request of $65.6 million is comprised of $37.6 million for operating expenses and $28 million for construction activities. The operating funds are for weapons activities and to pay various forms of gross receipts and sales/use taxes imposed by the States of Colorado, Missouri, Nevada, New Mexico, and Ohio. Included in the construction funding is $7.6 million to initiate environmental improvements at the Y-12 Plant in Oak Ridge, Tennessee; and $20.4 million for safeguards and security upgrading at LANL, SNL (Albuquerque), NTS, Y-12, and the Pinellas Plant. The FY 1985 budget request coupled with the requested FY 1984 supplemental, will serve to meet the anticipated needs of the nuclear weapons complex.

Production capacity has kept pace with the NWSM requirements due, in part, to the restoration program and to increased productivity.

I believe that the measured growth projected in the Strategic Defensive Initiative serves to complement our ongoing research, development, and testing program.

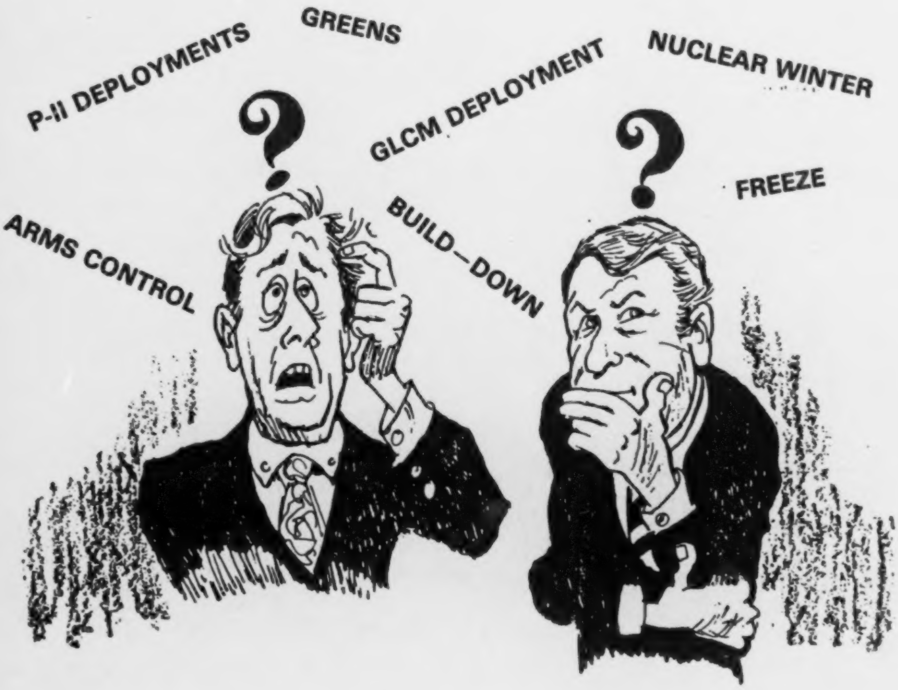
We have encountered serious environmental problems which we are committed to overcome. Some of these problems could not have been foreseen, but some could have been alleviated had we had a certain amount of management flexibility. We need to work together to develop a mechanism which will provide the ability to move quickly to solve a problem without a concomitant impact on delivery schedules.

We are proud of the nuclear weapons complex and, especially, its major resource, its people, with its ability to meet production requirements year after year and yet be in a position to meet new challenges. We must continue to plan and fund for the long term to maintain this unique resource. Mr. Chairman, this concludes my statement.

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

WEAPONS COMPLEX

- HIGH TECHNOLOGY CORPORATION
- UNIQUE - SOLE SOURCE
- MAINTAIN MARGIN FOR NATIONAL SECURITY
- HEDGE AGAINST UNCERTAINTY
- MUST BE SAFE, SECURE, ENVIRONMENTALLY ACCEPTABLE


P-II DEPLOYMENTS
GREENS
GLCM DEPLOYMENT
NUCLEAR WINTER
FREEZE
ARMS CONTROL
BUILD—DOWN
?
?

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

NUCLEAR DETERRENCE

- HAS WORKED
- NUCLEAR WEAPON FUNDAMENTAL
- RISK OF NUCLEAR WAR INCREASES IF DETERRENCE WEAKENS
- ALTERNATIVES TO NUCLEAR WEAPONS ALSO CARRY RISK

CHART 4

INVESTMENT STRATEGY FOR 1984 AND BEYOND

- MEET PRODUCTION NOW AND IN THE FUTURE

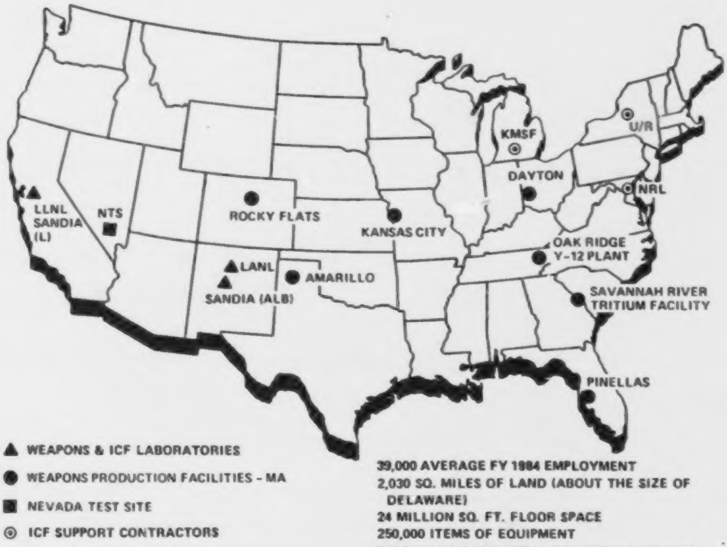
DELETED

- INCREASE RD&T MANPOWER 15%
- INCREASE TESTING

DELETED

- REVITALIZE AGING PLANT
  - RESTORATION
  - RD&T FACILITIES
- IMPROVE CERTAIN WEAPONS IN THE STOCKPILE
- PROVIDE MANAGEMENT AND MANUFACTURING FLEXIBILITY

DEFENSE PROGRAMS — WEAPONS ACTIVITIES


LLNL
SANDIA (L)
NTS
ROCKY FLATS
KANSAS CITY
LANL
SANDIA (ALB)
AMARILLO
KMSF
DAYTON
U/R
NRL
OAK RIDGE Y-12 PLANT
SAVANNAH RIVER TRITIUM FACILITY
PINELLAS
▲ WEAPONS & ICF LABORATORIES
● WEAPONS PRODUCTION FACILITIES - MA
■ NEVADA TEST SITE
◎ ICF SUPPORT CONTRACTORS

39,000 AVERAGE FY 1984 EMPLOYMENT
2,030 SQ. MILES OF LAND (ABOUT THE SIZE OF DELAWARE)
24 MILLION SQ. FT. FLOOR SPACE
250,000 ITEMS OF EQUIPMENT
$13 BILLION ESCALATED ACQUISITION COSTS IN FY 1985 DOLLARS

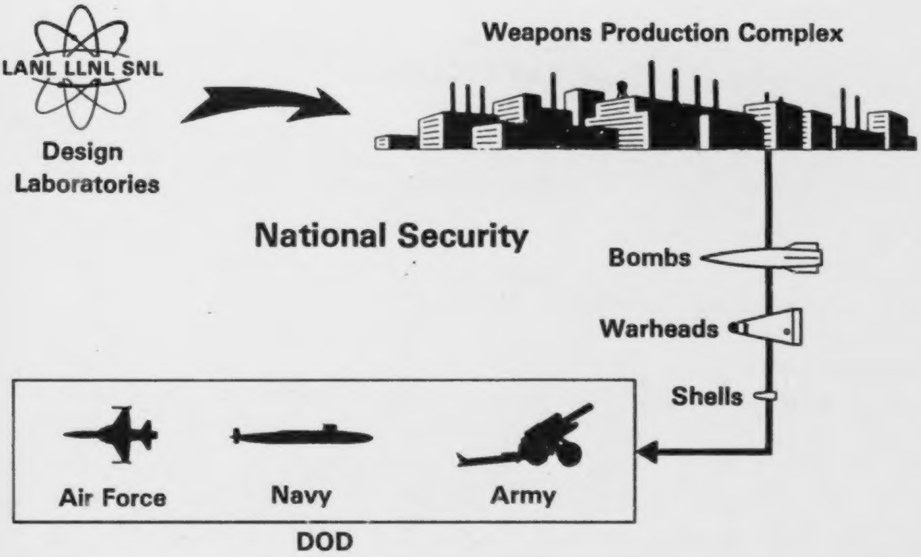

LANL LLNL SNL
Design Laboratories
Weapons Production Complex
National Security
Bombs
Warheads
Shells
Air Force
Navy
Army
DOD

CHART 11

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

PRODUCTIVITY

- INCREASE IN PRODUCTIVITY IS TOP MANAGEMENT GOAL
- RESTORATION PROGRAM IS INCREASING OUR ABILITY TO DESIGN AND PRODUCE COMPONENTS CHEAPER
- REVIEW PROCESS INSTITUTED TO ENSURE MOST COST-EFFECTIVE MANUFACTURING PROCESSES ARE USED
- FORMAL MECHANISM WITH DOD FOR COMMENTING ON COST AND PRODUCIBILITY OF WEAPONS FEATURES
- TREND IN INDEX OF PRODUCTIVITY HAS BEEN POSITIVE

FY 1985 CONGRESSIONAL SUBMISSION (B/A $ IN MILLIONS)

	FY 1983 ACTUAL	FY 1984 ESTIMATE	FY 1985 ESTIMATE AUTH.	FY 1985 ESTIMATE APPROP.
RESEARCH AND DEVELOPMENT	738.5	844.3	1,085.2	1,085.2
TESTING	446.9	565.0	638.0	638.0
INERTIAL CONFINEMENT FUSION	189.8	169.7	138.0	138.0
PRODUCTION AND SURVEILLANCE	1,916.8	2,136.7	2,604.6	2,621.7
PROGRAM DIRECTION	54.4	57.5	60.2	60.2
TOTAL WEAPONS ACTIVITIES	$3,346.4	$3,773.2	$4,526.0	$4,543.1

	FY 1984 SUPPLEMENTAL
• STATE SALES/USE TAX LIABILITIES	$37.6
• SAFEGUARDS AND SECURITY, VL	20.4
• ENVIRONMENT, HEALTH, AND SAFETY, Y-12	7.6
TOTAL WEAPONS ACTIVITIES	$65.6

CHART 22

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

PRODUCTION & SURVEILLANCE

Maintain, Produce, and Deliver Nuclear Weapons to the Stockpile

FY 1985 PRODUCTION AND SURVEILLANCE RESOURCES PROVIDE FOR:

-
- DELETED
-
- REPAIRS, DISPOSALS, AND EXCHANGE OF LIMITED-LIFE COMPONENTS APPLICABLE TO THE EXISTING NUCLEAR WEAPONS STOCKPILE
- WEAPONS-RELATED TRANSPORTATION AND SAFEGUARDS ACTIVITIES
- FULL-SCALE PRODUCTION OF B61 BOMB, W76 TRIDENT MK4, W79 8-INCH AFAP, W80-0 SLCM, W80-1 ALCM, B83 BOMB, W84 GLCM, AND W85 PERSHING II
- PRODUCTION ENGINEERING AND LONG-LEAD PROCUREMENTS FOR THE W81 SM-2, W87 PEACEKEEPER, TRIDENT II, ADVANCED AIR-TO-SURFACE MISSILE SYSTEM, AND ASW/SOW
-

DELETED

CHART 23

PRODUCTION INITIATIVES

- CAD/CAM
- REDUCTION OF RETROFIT RATE AND TOTAL FOR POSEIDON SLBM WARHEAD
- REDUCTION OF TOTAL TRIDENT I SLBM WARHEAD REQUIREMENT

DELETED

- ADDRESS CAPABILITY AND CAPACITY OF PRODUCTION COMPLEX

CHART 24

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

FY 1985 WEAPONS PRODUCTION AND SURVEILLANCE CONSTRUCTION
(Budget Authority in Millions)

	FY 1984	FY 1985
NUCLEAR WEAPONS PRODUCTION FACILITIES	$ 53.3	$121.1
UTILITIES & EQUIPMENT RESTORATION	185.0	175.1
GENERAL PLANT PROJECTS	23.0	32.2
SAFEGUARDS & SECURITY UPGRADING	18.5	29.7
ENVIRONMENT, SAFETY, & HEALTH IMPROVEMENTS	8.6	43.2
SUPPORT FACILITIES	55.8	138.1
TOTAL PRODUCTION & SURVEILLANCE CONSTRUCTION FUNDING	$344.2	$539.4

CHART 30

NEW CONCEPTS AND PROGRAM BALANCE

RD&T FUNDING HISTORY
(IN FY 1985 DOLLARS)

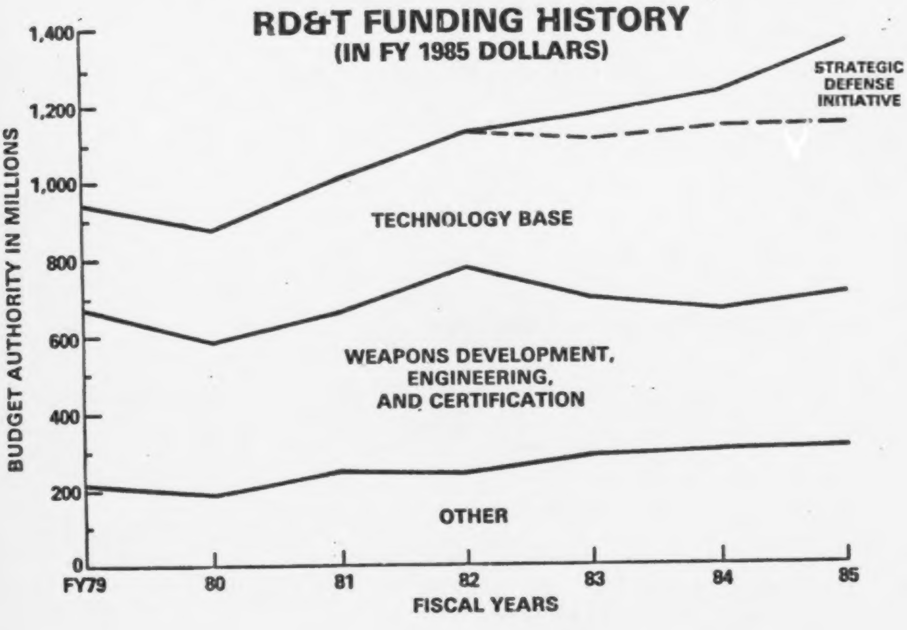


CHART 31

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

PRESIDENT'S SPEECH — MARCH 23, 1983

"I AM DIRECTING A COMPREHENSIVE AND INTENSIVE EFFORT TO DEFINE A LONG-TERM RESEARCH AND DEVELOPMENT PROGRAM TO BEGIN TO ACHIEVE OUR ULTIMATE GOAL OF ELIMINATING THE THREAT POSED BY STRATEGIC NUCLEAR MISSILES"

CHART 32

FLETCHER STUDY CONCLUSIONS

POWERFUL NEW TECHNOLOGIES ARE BECOMING AVAILABLE THAT JUSTIFY A MAJOR TECHNOLOGY DEVELOPMENT EFFORT TO PROVIDE FUTURE TECHNICAL OPTIONS FOR DEFENSE AGAINST NUCLEAR BALLISTIC MISSILES

PROGRAM FEATURES

- MULTIPLE LAYERS
- TECHNICAL DEMONSTRATIONS
- SURVIVABILITY
- INNOVATION

CHART 35

INERTIAL CONFINEMENT FUSION
(Budget Authority in Millions)

	FY 1983	FY 1984	FY 1985
OPERATING EXPENSES	$140.0	$145.0	$125.0
CAPITAL EQUIPMENT	11.0	11.8	9.5
CONSTRUCTION	38.8	12.9	3.5
TOTAL	$189.8	$169.7	$138.0

CHART 39

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

INERTIAL CONFINEMENT FUSION

FY 1985 REQUEST

- REDUCES PACE OF EXPERIMENTS
- SLIGHTLY REDUCES UR, KMSF, NRL SUPPORT
- ENDS CO_2 LASER EVALUATION EARLY
- COMPLETES PBFA II CONSTRUCTION

CHART 40

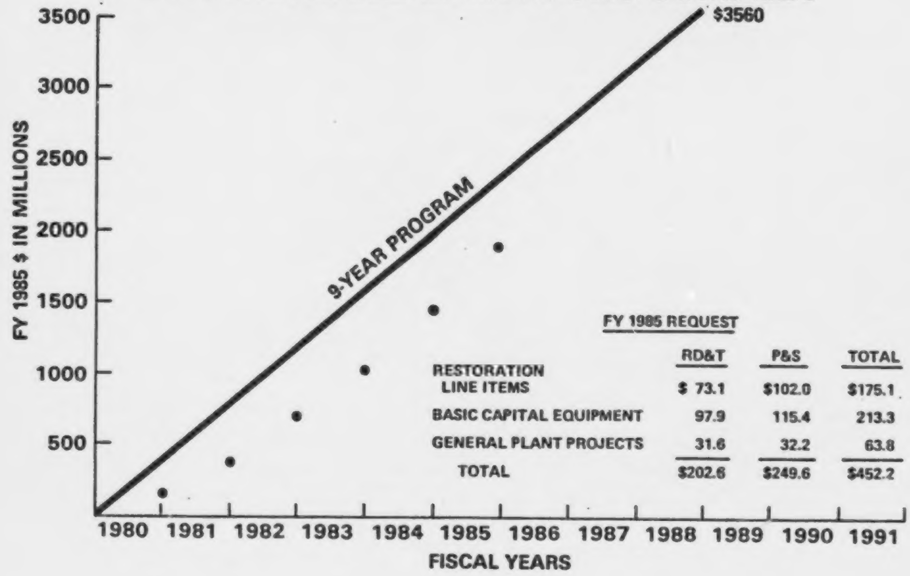
CROSSCUTTING REQUIREMENTS

- RESTORATION AND REVITALIZATION
- ENVIRONMENTAL PROTECTION
- SAFEGUARDS AND SECURITY

CHART 41

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

FUNDING REQUIREMENTS TO RESTORE & MAINTAIN NUCLEAR WEAPONS COMPLEX



FY 1985 REQUEST

	RD&T	P&S	TOTAL
RESTORATION LINE ITEMS	$ 73.1	$102.0	$175.1
BASIC CAPITAL EQUIPMENT	97.9	115.4	213.3
GENERAL PLANT PROJECTS	31.6	32.2	63.8
TOTAL	$202.6	$249.6	$452.2

CHART 42

REVITALIZATION
(DOLLARS IN MILLIONS)

- INITIATION OF RD&T REVITALIZATION PROGRAM IN FY 1985
- RESEARCH, DEVELOPMENT, AND TESTING COMPLEX

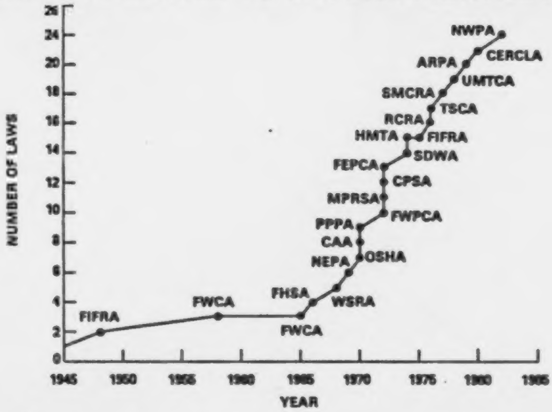
		FY 1985	
	TEC	AUTHOR.	APPROP.
— 85-D-102 NUCLEAR WEAPONS RESEARCH, DEVELOPMENT, AND TESTING FACILITIES REVITALIZATION, PHASE I, VL	$143.9	$56.6	$56.6
— 84-D-107 NUCLEAR TESTING FACILITIES REVITALIZATION, VL	75.2	34.9	34.9

- FY 1985 FUNDING SUPPORTS THE MOST URGENTLY NEEDED REQUIREMENTS OF THE RD&T COMPLEX
- CONSOLIDATION OF THE NUCLEAR WEAPONS RD&T REVITALIZATION NEEDS INTO ONE PROJECT FOCUSES THE ISSUE OF THE TOTAL NEEDS OF THE RD&T PROGRAM

CHART 44

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

LEGISLATION RELATED TO ENVIRONMENTAL PROTECTION



FIFRA — FEDERAL INSECTICIDES, FUNGICIDE, AND RODENTICIDE (1948, 1972, 1975)
FWCA — FISH AND WILDLIFE COORDINATION (1958, 1965)
FHSA — FEDERAL HAZARDOUS SUBSTANCES (1966)
WSRA — WILD AND SCENIC RIVERS ACT (1968)
NEPA — NATIONAL ENVIRONMENTAL POLICY (1969)
PPPA — POISONIOUS PACKAGING PREVENTION (1970)
OSHA — OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA — CLEAN AIR (1970, 1977)
FWPCA — FEDERAL WATER POLLUTION CONTROL (NOW CLEAN WATER) (1972, 1977)
MPRSA — MARINE PROTECTION, RESEARCH, AND SANCTUARIES (1972)
CPSA — CONSUMER PRODUCT SAFETY (1972)
FEPCA — FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA — SAFE DRINKING WATER (1974, 1977)
HMTA — HAZARDOUS MATERIALS TRANSPORTATION (1974)
RCRA — RESOURCE CONSERVATION AND RECOVERY (1976, 1979)
TSCA — TOXIC SUBSTANCE CONTROL (1976)
SMCRA — SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTCA — URANIUM MILL TAILINGS CONTROL (1978)
ARPA — ARCHEOLOGICAL RESOURCE PROTECTION ACT (1979)
CERCLA — COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (1980)
NWPA — NUCLEAR WASTE POLICY ACT (1982)

CHART 45

Y-12 PLANT ENVIRONMENTAL IMPROVEMENTS
(B/A IN MILLIONS)

	CONSTRUCTION COSTS	
	FY 1984	FY 1985
PROJECT 81-D-120, CONTROL OF EFFLUENTS AND POLLUTANTS (TEC-$7.8)	$1.0	$ 1.4
*PROJECT 84-D-124, ENVIRONMENTAL IMPROVEMENTS (TEC-$56.0)	7.6	21.4
PROJECT 85-D-121, AIR AND WATER POLLUTION CONTROL FACILITIES (TEC-$29.0)	—	5.0
	$8.6	$27.8

*FY 1984 SUPPLEMENTAL BUDGET REPORT

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

ENVIRONMENTAL, SAFETY, AND HEALTH
(DOLLARS IN MILLIONS)

FY 1984 SUPPLEMENTAL		FY 1985	
AUTHOR.	APPROP.	AUTHOR.	APPROP.
7.6	7.6	36.5	48.1

FY 1985 WEAPONS PROGRAM BUDGET SUMMARY

- THE BUDGET:
  - MEETS ALL NWSM REQUIREMENTS
  - SUPPORTS GROWTH IN STRATEGIC DEFENSE INITIATIVE
  - CONTINUES RESTORATION PROGRAM
  - CONTINUES FY 1984 TEST REVITALIZATION PROGRAM AND INITIATES RD&T PROGRAM
  - SUPPORTS LONG-TERM COMMITMENT TO ENVIRONMENT, SAFEGUARDS, AND SECURITY
  - SUPPORTS VIABLE ICF PROGRAM
  - CONTINUES STOCKPILE IMPROVEMENT PROGRAM

STATEMENT OF F. CHARLES GILBERT

Mr. Chairman and Members of the Committee. It is a pleasure to discuss with you the Department of Energy's FY 1985 Nuclear Materials program. This program is made up of two major components, materials production and defense waste management.

(Chart 1) The Nuclear Materials' FY 1985 request for $2.62 billion in budget authority includes $1.86 billion for Nuclear Materials Production and $753 million for Defense Waste and Byproducts Management. We are also requesting an FY 1984 supplemental appropriation of $86 million for Materials Production to alleviate security and environmental concerns and to ensure the availability of highly enriched uranium to meet weapons requirements.

NUCLEAR MATERIALS PRODUCTION REQUIREMENTS

(Chart 2) The Nuclear Materials Production program is responsible for producing nuclear materials for use in military, Government research and development, and civilian programs that use radioisotopes for research, commercial, and medical applications. Of these, the primary objective is providing special nuclear materials for national defense requirements.

DEFENSE NUCLEAR FUEL CYCLE

(Chart 3) The facilities involved in the production of special nuclear materials are located at six major sites. Oak Ridge, Fernald, and Ashtabula provide uranium of proper enrichment levels to act as feed for production reactors. Savannah River and Richland fabricate these feed materials into fuel or targets. The Savannah River reactors produce both plutonium and tritium. The N Reactor at Richland produces weapon-grade plutonium. These sites then process the irradiated fuels to recover plutonium, tritium, and other valuable materials and byproducts. Idaho receives, stores, and processes fuels from Navy propulsion, research, and test reactors to recover residual enriched uranium primarily for use as fuel for the Savannah River reactors.

NUCLEAR WEAPONS STOCKPILE

(Chart 4) The Nuclear Materials Production budget is driven by the requirements for tritium, plutonium, and enriched uranium set forth in the Nuclear Weapons Stockpile Memorandum approved annually by the President. The FY 1984 Nuclear Weapons Stockpile Memorandum, signed by the President on February 16, 1984, contains stockpile requirements projected through FY 1999.

The total number of weapons has decreased from a high [Deleted] in 1967 to a low [Deleted] in 1982 and is projected to return to a level of [Deleted]. Older weapons are continuously being retired and replaced with newer, safer, and smaller weapons. You will note that this long-range projection assumes retirement [Deleted] of the current older weapons [Deleted] [Deleted]. Most of the nuclear material for the modernized weapons comes from these retired weapons. However, the modest increase in the total number of weapons, along with the increase in plutonium and tritium required per weapon, drives the demand for these materials.

(Chart 5)

[Deleted]

Plutonium equivalent is a weighted sum of both plutonium and tritium.

[Deleted]

NUCLEAR MATERIALS REQUIREMENTS

(Chart 6) We have just looked at the number of weapons included in the current stockpile projections. Now we can look at the corresponding material requirements. [Deleted]

Most of the nuclear materials required for building new warheads are obtained by reclaiming and recycling existing materials from retired weapons, returned by the Department of Defense to the Department of Energy. Material requirements which cannot be met from Department of Defense returns or existing inventories must be satisfied by new production.

[Deleted]

Allow me to spend just a minute or two explaining how we expect to fill this demand.

(Chart 7) Here we have the projected annual production rates by source for plutonium equivalent through FY 1999. The increase in production is due largely to our FY 1981 production initiatives--efforts this committee has strongly supported.

[Deleted] Among the new initiatives responsible for the future rise in production are plutonium blending, higher productivity Mark-15 reactor cores, the facilities restoration program, conversion of the N Reactor to weapon-grade plutonium production, and the projected startup of a special isotope separation facility.

[Deleted]

(Chart 8)

[Deleted]

The weapons program has operated within the existing inventory of enriched uranium for the last 20 years by recycling material from retired warheads. Although recycling continues, a need for new quantities of highly enriched uranium is projected, starting about FY 1988.

FY 1984 SUPPLEMENTAL REQUEST

(Chart 9) Before I specifically discuss the FY 1985 budget, I would like to describe our need for additional FY 1984 funding. We are requesting a supplemental budget of $85,800,000 to meet material production, security, and environmental requirements that have risen subsequent to establishment of our current FY 1984 budget.

URANIUM SUPPLY

(Chart 10) First, $4,900,000 is required to reactivate the existing dry chemistry facility at the Oak Ridge Y-12 Plant. This facility converts highly enriched gaseous uranium hexafluoride to solid uranium tetrafluoride, a form that is needed to make uranium metal. The existing facility was shut down in 1964 because projections then indicated that our highly enriched uranium inventory was sufficient for many years. The facility is now needed [Deleted]

. Highly enriched uranium metal is used directly as a component of nuclear weapons and as fuel for the Savannah River reactors. It is also used in the Department's research and test reactors. [Deleted]

[Deleted] it is essential that the Oak Ridge dry chemistry facility be operational in early FY 1988.

[Deleted]

SECURITY

(Chart 11)

[Deleted]

Savannah River's role as the United States primary producer of tritium and plutonium for weapons has been receiving increased media and public attention, increasing the risk of terrorist acts. We have experienced several minor demonstrations there during the past year. As a result, we have taken a comprehensive look at the security measures at Savannah River. The Department's Office of Safeguards and Security, the Office of the Inspector General, and the Savannah River Office of Safeguards and Security have conducted assessments of Savanah River's security measures.

[Deleted]

ENVIRONMENTAL ACTIVITIES

(Chart 12) Finally, our supplemental request provides $37,000,000 to initiate or accelerate several environmental activities needed to bring the Savannah River Plant into compliance with appropriate State and Federal environmental regulations. Savannah River was recently granted a new national pollutant discharge elimination system permit to allow continued operation of the three currently operating reactors. A consent order provides a delay in full compliance until thermal mitigation measures can be put in place. Negotiations for the new permit were difficult since the point of compliance for reactor thermal discharge must now be where thermal effluents enter the site streams rather than where the site streams enter the Savannah River as previously required. The new permit places even more stringent requirements on plant operations. Failure to proceed to bring the Savannah River Plant into compliance could result in legal action by the State of South Carolina and environmental organizations, which could potentially impact many operations at the Savannah River Plant. The requested funding will be used to begin decommissioning the fuel fabrication area seepage basin that has contaminated the groundwater in the vicinity of the facility with chlorocarbon degreasing chemicals; accelerate construction of facilities to control hazardous liquid effluents; and treat and dispose of other hazardous wastes generated onsite.

This completes my discussion of the supplemental budget request necessary to support planned additional FY 1984 production, security, and environmental activities.

FY 1985 BUDGET REQUEST

(Chart 13) As I mentioned earlier, we are requesting $1.86 billion in FY 1985 for support of the Materials Production program. Of this amount, $1.42 billion is needed for continuing base activities, production activities, $327 million for production initiatives, and $121 million for highly enriched uranium for the nuclear Navy.

BASE ACTIVITIES

(Chart 14) Meeting program objectives requires operation of four Savannah River reactors, including the L Reactor; the Richland N Reactor; four chemical processing plants; reactor fuel fabrication facilities; utilities; and other site support facilities. The base program also supports processing of naval and research and development reactor spent fuels and nonspecification nuclear materials to supplement new production. Considerable funding is required for maintenance and equipment replacement, and for security and environmental improvements.

The FY 1985 budget supports the first full year of operation of the PUREX fuel processing plant and supporting facilities at

Richland. PUREX will process newly irradiated fuel from N Reactor, as well as fuel that has been stored since 1972, to recover weapon-grade and fuel-grade plutonium for blending or special isotope separation feed. PUREX was reactivated in November 1983, 5 months ahead of schedule. We are very grateful to this committee for providing the strong support that enabled us to complete this important milestone.

NEW PRODUCTION REACTOR

(Chart 15) A new production reactor is expected to be required to assure a reliable supply of tritium that is vital to maintaining the effectiveness of the nuclear weapons in our stockpile. We currently produce tritium in the Savannah River reactors that are already 30 years old. Additionally, the Richland N Reactor is expected to reach the end of its useful life by the mid-nineties. A new reactor would provide reliable tritium production as well as the capability to produce other reactor materials well into the next century. Accordingly, it is prudent that the activities leading to selection of a reactor concept and site for construction continue to proceed in a timely manner.

(Chart 16) Starting in FY 1984, the Department initiated a series of activities to provide a suitable basis for recommending to the President in mid-FY 1985 a reactor concept for the new production reactor and the site where it should be located. An NPR Project Office has been established to prepare site-specific cost estimates, conduct systems and safety studies, and prepare environmental analyses for three candidate DOE sites--Richland, Idaho, and Savannah River--and the principal candidate reactor concepts--heavy water, light water, and gas cooled. FY 1985 funding of $5 million is requested to complete these activities by mid-FY 1985, so the issue of a new production reactor may be fully considered in the FY 1986 budget process.

L REACTOR

(Chart 17) Our FY 1985 request includes funding for operating L Reactor at Savannah River. The construction program to upgrade L Reactor, initiated in FY 1981, was completed in October 1983 on schedule. The Department is currently preparing an environmental impact statement scheduled to be published in April 1984. The schedule for restart of the reactor will be determined after publication of the Record of Decision in May. Since L Reactor will add [Deleted] plutonium equivalent annually to the weapons program, it is extremely important to restart and bring it to full operation as soon as possible. We hope to be able to restart the reactor about the end of calendar year 1984.

SECURITY

(Chart 18)

[Deleted]

ENVIRONMENTAL UPGRADES

(Chart 19) DOE is taking action to comply with applicable environmental laws. Groundwater contamination has been identified at various locations on the Savannah River site, and legislation passed by the Congress and signed into law requires terminating use of certain seepage basins by November 30, 1985. To accomplish these objectives, the FY 1985 request includes funding to continue the environmental cleanup program at the Savannah River Plant including: the elimination of hazardous industrial waste discharges to ground and surface waters; the cleanup of groundwater contamination; the deactivation of seepage basins in the fuel fabrication area; and reactor thermal discharge mitigation measures. The requested funding is required to conduct planned evaluations and define and undertake necessary mitigation activities.

The Feed Materials Production Center at Fernald, Ohio, will continue its water pollution control project to provide facilities by July 1, 1986, needed for compliance with the objectives of the Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977. The pollutants of primary concern are nitrates, ammonia, chlorides, suspended solids, and acidity of the coal pile drainage.

FACILITIES RESTORATION

(Chart 20) The facilities restoration program is in the fifth year of a six-year funding schedule. This program will restore the production capability of much of the complex that diminished during the 1970's. Without the restoration program, our facilities, now approximately 30 years old, would rapidly deteriorate or become obsolete. This would cause a significant decrease in production capability and efficiency and would result in production losses that could not be recovered. Your continued support of the restoration program is vital since we cannot achieve our production goals without a fully functioning production complex.

IDAHO RESTORATION

(Chart 21) Facilities at the Idaho site were not included in our Facility Restoration program.

[Deleted]

We are requesting funding for a design-only project at Idaho to increase capacity and ensure reliability sufficient to process the scheduled fuel returns. The conservation of resources in recovering this enriched uranium at Idaho is cost beneficial for the operation of the Savannah River reactors because it greatly reduces the amount of new highly enriched uranium that must be produced or withdrawn from the Oak Ridge inventory.

PRODUCTIVITY IMPROVEMENTS

(Chart 22) Our FY 1985 request includes $50.7 million for three activities to improve the reliability and efficiency of our facilities.

During FY 1984 we initiated research and development on techniques for improving the fuel cycle performance of the Savannah River reactors. This activity has considerable promise and cost benefits for the Materials Production program. The fuel cycle improvements program uses the plasma separation process, being developed by TRW, for the removal of unwanted isotopes of uranium from the recycled uranium fuel used in the Savannah River Plant reactors. A fuel cycle improvement development facility could increase reactor production and decrease the need to purchase new uranium from the Department's gaseous diffusion plants. Since less fuel fabrication alloy material is necessary, due to the reduced uranium content, waste management costs will also be reduced. The total cost of the fuel improvement process development facility is estimated to be $90 million with a projected payback period of 4 years. Once operational, this program will result in annual net savings of over $37 million for as long as the Savannah River reactors continue to operate.

At Fernald, Ohio, a productivity and radiological improvements program is planned to ensure the continued, safe, reliable, and efficient operation of our reactor fuel fabrication facilities. Since 1981 we have increased the use of this plant from some 20-30 percent of capacity to about 70 percent and, as a result, several existing facilities need to be upgraded or modernized to continue feed production for production reactors and weapons component fabrication plants.

Richland will continue the N Reactor productivity improvements program to maintain current state-of-the-art technology levels and to meet stricter safety and environmental requirements.

MARK-15 CORES

(Chart 23) The high productivity Mark 15 core will replace the current Savannah River reactor fuel with slightly enriched uranium fuel to provide a uniform fuel core loading. Mark 15 cores will increase plutonium metal production [Deleted] [Deleted] for each reactor operating to produce plutonium. This results in an overall increase [Deleted] in total plutonium equivalent production, [Deleted] [Deleted] gain through the planning period, from the Savannah River reactors, based on our current plutonium and tritium production plans. Our request of $113.5 million includes $23 million to prepare for the conversion to the Mark 15 operating mode with the first reactor converted in late FY 1986 and $90.5 million for the purchase of slightly enriched uranium from the gaseous diffusion plants.

SPECIAL ISOTOPE SEPARATION

(Chart 24) The FY 1985 budget provides $39 milion for continuing the plutonium special isotope separation program and provides for the continuation of atomic vapor laser isotope separation process research and development. It reflects the assessment that a somewhat longer period of research and development is needed before construction of an atomic vapor laser isotope separation production prototype facility. It will enable the Lawrence Livermore National Laboratory to continue experiments begun in FY 1984, will support the development of a plutonium atomic vapor laser isotope separation process demonstration system in FY 1987, and will provide for continuation of developmental support activities at the Hanford site, including the conceptual design of the facilities and equipment needed for an atomic vapor laser isotope separation production prototype facility with operation in FY 1989. The status of plutonium laser isotope separation technology will be reviewed before the end of FY 1984, by a joint Office of Science and Technology Policy-Department of Energy panel, to determine whether any changes are required in the planned program.

(Chart 25) The Process Facility Modification Project, initiated in FY 1984, is being delayed 1 year, consistent with the delay in the special isotope separation program. In the longer term, however, the additional defense programs-origin recovered plutonium made available by this project could be utilized for blending without a special isotope separation facility.

We will continue funding the Los Alamos National Laboratory molecular laser isotope separation process to produce special isotopes [Deleted] . We are requesting $15 million to continue molecular laser isotope separation process development as part of our base program.

REACTOR SAFETY

(Chart 26) The reactor safety program, begun in FY 1981, will reduce the probability of accidents, enhance safe operations, and improve our capability to manage emergency conditions.

FY 1985 funding will be used to train new and current contractor employees on reactor operation by simulation of real-life situations, to conduct nondestructive testing of reactor internals, to improve reactor coolant instrumentation and computerization, to develop lessons-learned studies, and to produce engineering safety studies.

[Deleted]

CONSTRUCTION PROJECTS

(Chart 27) I have already discussed most of our new construction projects as they relate to major issues. Our request also includes an important new project for a uranium nitrate to oxide conversion facility at Savannah River. This project will replace deteriorating equipment and facilities at our Oak Ridge Y-12 Plant, [Deleted] and will prevent operational interruptions.

(Chart 28) Our request includes second year funding for the three new projects requested as part of the FY 1984 supplemental. These projects are 84-D-134, Safeguards and Security Improvements, at Savannah River; 84-D-136, Enriched Uranium Conversion Facility Modifications, at Oak Ridge; and 84-D-137, Facility Security Systems Upgrade, at Idaho.

(Chart 29) Our FY 1985 request includes final year funding for 82-D-201, Special Plutonium Recovery Facilities, at Savannah River.

[Deleted]

MATERIALS PRODUCTION HIGHLIGHTS

(Chart 30) In summary, the major elements of our proposed FY 1985 Materials Production budget are directed towards meeting the Nuclear Weapons Stockpile Memorandum requirements and achieving enhanced safety, security, and environmental protection. We plan to:

- Continue in FY 1985 the base production activities ongoing in FY 1984,

- Continue initiatives to increase production.
- Purchase enriched uranium for materials production and nuclear navy requirements, and
- Alleviate [Deleted] environmental concerns of production sites.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

I would now like to turn to the Defense Waste and Byproducts Management Program. This program provides for the management of radioactive waste generated primarily by the Department's defense activities in support of the production of nuclear materials and weapons, the nuclear Navy and other R&D activities of the Department. It includes the development of technologies and facilities for storage and disposal of high-level, transuranic, and low-level wastes, and for utilization of byproducts.

The goal of the Defense Waste and Byproducts Management program is to manage defense nuclear waste routinely, safely, and effectively. This goal includes the disposal of the backlog of stored defense waste located at the sites shown on Chart 31. The next chart (Chart 32) shows the volume of waste that has been generated from over 30 years of nuclear material production activities. Although we are continuing to generate high-level waste, our volumetric inventory remains relatively constant due to our waste concentration efforts. In addition, we are continuing to add about 5,500 cubic meters of transuranic waste each year.

In June 1983 the President submitted to you the Defense Waste Management Plan which reflects our plans for permanent disposal of high-level and transuranic waste in response to Public Law 97-90. It shows a reasonable and affordable way to meet this goal through the implementation of the policy shown on Chart 33. By careful evaluation of risks and benefits, and through technological improvements, we feel the costs to implement the program are reasonable. We will continue to dispose of low-level waste on the sites where it is generated.

Our FY 1985 budget is consistent with the policies contained in the Defense Waste Management Plan. With very few exceptions, we are maintaining the schedules reflected in the plan. As I discuss each major area of the plan, I will point out the exceptions. New activities in FY 1986 and beyond will be evaluated annually, during the normal budget cycle, in terms of their scope, timing, need, and relative ranking compared to other Departmental priorities. I will describe our overall plans for disposing of defense high-level waste and transuranic waste through the year 2015.

HIGH-LEVEL WASTE

High level waste is, in general, that highly radioactive waste that originates as a liquid from our defense fuel reprocessing sites at Savannah River, Idaho, and Hanford. Our first objective is to end interim storage of high-level waste in tanks and bins and achieve permanent disposal by immobilizing and preparing high-level waste for shipment to a geologic repository. Our schedule for accomplishing this task is shown on Chart 34.

We are right on schedule with regard to construction of the Defense Waste Processing Facility at Savannah River. Construction began in October 1983 and we expect to complete it in 1988 and begin operations in 1989. With regard to Hanford, our original schedule was somewhat ambitious. Because of the need to firm up the requirements and planning for the immobilization plant at that site, construction originally planned for 1985 is not expected to begin until at least FY 1987. We are spending the interim time planning in order to minimize the processes and costs of the facility. With regard to Idaho, the newly completed Waste Calcining Facility, which processes liquid waste to a granular form, continues to operate exceptionally well. The granular waste or calcine is stored in stainless steel bins and represents a very safe interim storage approach pending ultimate disposal of waste from that site in the early part of the twenty-first century.

With regard to the permanent disposal of defense high-level waste in a geologic repository, the Nuclear Waste Policy Act of 1982, P.L. 97-425, directed the President to evaluate by January 1985 the use of commercial waste disposal capacity for defense high-level waste. The Act requires the President to evaluate cost efficiency, health and safety, regulatory, transportation, public acceptability, and national security factors. Unless the evaluation concludes that national security and other considerations necessitate a dedicated defense waste repository, the Secretary of Energy is directed to proceed with arrangements for disposing of defense waste in the same repository used for commercial waste. Preparation of the study to support the evaluation is underway.

TRANSURANIC WASTE

Transuranic waste is that waste that contains the long-lived radioactive elements beyond uranium in the periodic table. The principal element in such waste is plutonium. The objectives of our plan with regard to transuranic waste are to end interim storage and achieve permanent disposal. Newly generated and stored defense transuranic waste will be certified for compliance with waste acceptance criteria for the planned repository and sent to the Waste Isolation Pilot Plant in New Mexico after processing (if necessary) and environmental documentation. After 5 years of operational experience, a decision will be made to leave or retrieve the transuranic waste. Our schedule for permanent disposal of defense transuranic waste is shown on Chart 35. We are on schedule with all activities shown on this chart. We expect to be certifying waste at all sites by the end of FY 1984. Our pilot facilities at Idaho are continuing on schedule and within cost estimates. The construction of the Waste Isolation Pilot Plant is proceeding extremely well, and we now expect to complete this facility by December 1986, 1 year sooner than previously anticipated.

COSTS

This next chart (Chart 36) shows the estimated annual costs for disposing of defense high-level and transuranic wastes. The costs peak at about $450 million in the mid-1980's due to the construction costs for the Defense Waste Processing Facility and the Waste Isolation Pilot Plant (WIPP). These costs will be eventually offset by a reduction in the costs of safely maintaining the radioactive wastes in their current form. In addition, the immobilized waste, sealed deep in an underground repository at the end of this period, will present no hazard to man or his environment.

I will now describe some recent accomplishments, our plans for FY 1985, and provide support for our request for FY 1985 funding. (See Chart 37.)

INTERIM WASTE OPERATIONS

The principal objective of this program is the ongoing management of existing and newly generated waste from naval reactors and production operations, pending implementation of permanent disposal operations. During fiscal years 1984 and 1985, the transfer of high-level waste from old tanks to new tanks will continue at the Hanford Reservation. An additional 17 tanks will be isolated from the environment in FY 1984 and 11 in FY 1985 for a total of 74 out of 149. This program will be completed in FY 1989 as scheduled.

The solidification and encapsulation of an additional 100 strontium capsules from high-level waste will be completed in FY 1984, and we expect to complete encapsulation of the backlog of strontium by the third quarter of FY 1985 (a total of 600 capsules planned) for safer storage and potential beneficial use. Encapsulation of the entire backlog of cesium (1,575 capsules) was completed in FY 1983. Also at Hanford, construction of the eight double shell tanks (begun in 1983) will be completed 9 months ahead of schedule (first quarter of FY 1986) assuring that adequate storage space is available for PUREX waste. Construction of the Waste Handling and Isolation Facility will continue which includes a portable grout facility to solidify low level liquid waste for shallow land disposal thus saving tank space.
The Savannah River waste transfer program is scheduled for

completion in 1994. Waste in single shell tanks will be removed by the fourth quarter of FY 1988. This reflects an optimum schedule interface between waste preparation in the tank farm and feed requirements for the Defense Waste Processing Facility (DWPF). In order to provide feed for DWPF operation, installation of sludge washing facilities will continue in 1985, and operation will begin in 1986. Installation of salt decontamination facilities will begin in 1985, and operation will begin in 1988. We will also initiate design and construction of a New Waste Transfer Facility in FY 1985 to continue safe H-Area tank farm operations and to interface with the DWPF.

WASTE VOLUME REDUCTION

Waste volume reduction is an important element of the Interim Waste Operations Program because it extends the lifetime of storage and disposal facilities and delays the need for new facilities. At Savannah River, for example, our goal for both FY 1984 and 1985 is to gain 6 million gallons of high-level waste storage through our evaporative processes each year. This is the volume equivalent of about six new tanks. At Hanford we have accelerated evaporator operations to support PUREX reprocessing operations, which began earlier this year.

Solid waste volume reduction operations will continue to reduce the rate of expansion of new burial ground facilities at our sites. Segregation and examination of transuranic waste will reduce the amount which must be stored, certified, and eventually transported to and emplaced in the WIPP. The first quantities of waste were certified in early FY 1983 for emplacement in WIPP. Funds invested in development and demonstration of volume reduction and waste segregation techniques will result in decreased requirements for disposal and storage facilities and their related operating, closure, and long-term maintenance and surveillance costs. We will continue to study improved volume reduction technology to enhance efficiency of transportation and disposal.

During FY 1985 we will continue to dispose of low-level waste and to retrievably store transuranic waste. We are continuing to develop and implement procedures to assure that newly generated transuranic waste is acceptable for emplacement in the WIPP. This certified waste is being stored separately.

The New Hydrofracture Facility (Chart 38) at Oak Ridge was completed in FY 1982 and began to inject a mixture of low-level waste and concrete into the shale formation under the site in June 1982. About 400,000 gallons of waste sludge from six old gunite tanks, whose construction dated back to the Manhattan Project, were disposed of in 1983 and 1984.

At the Idaho National Engineering Laboratory, the New Waste Calcining Facility (NWCF) (Chart 39) began operations in September 1982. This facility converts liquid high-level waste into a granular solid, called "calcine," for interim storage in bins. The NWCF is a critical element of the fuel processing operation at Idaho, since there is no excess capacity for lag storage of liquid high-level waste. Since startup, this facility has solidified more than one million gallons of liquid. In fact, the NWCF has consistently operated at greater than design basis (sometimes as much as 50 percent greater than anticipated). The construction of the sixth set of storage bins for calcine will continue at Idaho with a scheduled completion in December 1984. Construction of the seventh set of bins will begin in March 1985 and be completed in June 1989. This will assure sufficient waste storage capacity is available to support production activities.

We are also investigating the feasibility of converting other waste inventories into beneficial byproducts. At Oak Ridge we are investigating the cost effectiveness of smelting about 80,000 tons of contaminated scrap metal into shielding blocks for use at several of the Department's high energy accelerator facilities. At Idaho we plan to demonstrate whether contaminated stainless steel can be smelted and fabricated into canisters for the immobilized high-level waste from the DWPF.

LANDLORD RESPONSIBILITIES

Under our landlord responsibilities, we will continue restoration of badly deteriorated general purpose support facilities and equipment to an acceptable standard of safety, reliability and efficiency. Our goal is to complete the "facilities restoration" part of our landlord responsibilities at Hanford in FY 1988. The FY 1985 Hanford landlord program includes the design and construction of a new central warehouse facility, since the old one is beyond economical repair.

At Idaho maintenance, repair, and replacement continue for general purpose site support facilities, such as utilities, roads and service buildings; and site security systems continue. Landlord responsibilities at Idaho were assumed in FY 1983. This landlord program will maintain the site fire and safety alarm systems. The Test Reactor Area (TRA) security system upgrade will start in FY 1985 to meet the requirements of the TRA security plan which requires state-of-the-art detection and intrusion alarm systems.

DECONTAMINATION AND DECOMMISSIONING

We are responsible for about 200 contaminated surplus defense facilities, including reactors, reprocessing plants, and waste management facilities. The facilities have been stabilized and are subjected to routine surveillance and maintenance. Our program emphasizes the safe management of these facilities, stressing beneficial reuse of structures, reduction of future maintenance costs, and recovery of valuable materials where cost effective. In FY 1984 funds have been allocated to complete long-term plans and outyear cost estimates and to begin only priority projects. For FY 1985 we will continue to provide surveillance and maintenance of all surplus defense facilities and continue high priority decommissioning work at Idaho, Mound Facility, Oak Ridge National Laboratory (ORNL), and Hanford with particular emphasis on facility reuse and cost effectiveness.

TRANSPORTATION OPERATIONS

We are also responsible for the Department-wide transportation operations and traffic management support programs to assure the safe, secure, efficient, and economic shipment of DOE materials in compliance with applicable Federal laws and regulations.

Major activities in FY 1984 for Transportation Operations and Traffic Management include reducing rates on DOE shipments through volume discounts, data automation for more efficient utilization and management of resources, training and workshops for personnel involved in DOE shipment of hazardous materials; and activities to assure uniform DOE compliance with DOT and IAEA rules and regulations.

In FY 1985 transportation management training will be expanded to include advanced training for traffic managers and DOE contractors. The packaging certification program will receive increased emphasis with documentation reviews to assure that the packagings for hazardous materials continue to meet current regulations. The negotiation with carriers will be expanded to assure even more efficient, economical movement of DOE shipments.

LONG-TERM WASTE MANAGEMENT TECHNOLOGY

This program addresses the long-term management and disposal of defense wastes. This program is consistent with the Defense Waste Management Plan for permanent disposal of defense high-level and transuranic waste the President submitted to you.

HIGH-LEVEL WASTE TECHNOLOGY

As I mentioned earlier, we are developing the technology for the long-term management of defense high-level waste at DOE sites with first emphasis on the DWPF at Savannah River. During FY 1985 we will perform large-scale tests with simulated waste to optimize the design and demonstrate the reliability of the DWPF systems, including slurry feed, off-gas, salt disposal, and process controls. Smaller scale tests with actual high-level waste from the Savannah River Plant will continue in hot cells. Together, these tests will assure that the DWPF will work as designed. We will continue to describe and document the predicted behavior of the glass waste form in a geologic repository and make confirmatory tests. During FY 1985 emphasis will shift toward planning, development, selection, and implementation of the long-term technology for high-level waste at Hanford.

DEFENSE WASTE PROCESSING FACILITY

(Charts 40-41) The DWPF will immobilize defense high-level waste at Savannah River for storage, transportation, and disposal in a geologic repository. The sludge fraction of the high-level waste, which contains most of the hazardous radionuclides and virtually all of the long-lived activity, will be immobilized directly in borosilicate glass after extracting mercury. The activity in the soluble salt fraction of the waste, primarily radioactive cesium, will be separated by precipitation in the tank farm and can be used as a beneficial byproduct, possibly in an immobilized form. The decontaminated salt will be solidified and disposed of on the Savannah River site. When the DWPF is operational in FY 1989, we will begin to work off the backlog of high-level waste from production operations at Savannah River, reaching a steady-state operation in about 15 years.

Construction of the DWPF began ahead of schedule in October 1983 and site grading, installation of temporary construction facilities, and equipment procurement are underway. The design is almost 50 percent complete and on schedule. Design and construction will continue in FY 1985, leading to "hot" operation in FY 1989. We are requesting $238 million for the project in FY 1985 which is our major program increase over FY 1984. This funding is necessary to maintain the project schedule and stay within the total estimated cost. By the end of FY 1985, the design will be about 80 percent complete. Construction of the main process buildings and support facilities will continue, and additional major procurements will be made for essential construction materials and equipment.

It is very important that our construction schedule be maintained. We have planned this project to be cost effective consistent with the Grace Commission's recommendations. Any delays will not only increase costs but will also cause significant operational problems at Savannah River. We are running out of tank space in which to store high-level waste, and we must continue to remove waste from the old tanks before problems develop. Major delays in DWPF could require the building of additional tanks and make the high-level waste cleanup job greater and more expensive.

The total estimated construction cost for the DWPF is $870 million and is based on a newly revised cost estimate. The amounts of escalation and contingency have been significantly reduced from the previous estimate of $910 million. Additional scope has also been added to the project that was originally planned for inclusion in a subsequent line item project (Stage 2). Technical improvements have eliminated the need for most of the Stage 2 requirements. The remaining items, which now make up about 10 percent of the DWPF project, are necessary to provide a complete facility to handle both sludge and salt waste. The cost estimate for this project has been reduced by about 70 percent from the original capital cost estimate of $2.8 billion (FY 1979) through research and development and design optimization. We will continue to pursue opportunities to reduce its cost even further through effective project management by DOE staff and contractors during the construction phase.

TRANSURANIC WASTE TECHNOLOGY

This technology program focuses on supporting the WIPP. The first priority is to certify newly generated waste for the WIPP if it meets the acceptance criteria. This reduces the growth in the backlog of stored waste that requires examination before it can be sent to or processed for the WIPP. Second, the inventory of "old" stored waste will be examined and certified or processed consistent with the WIPP schedule.

In Idaho we have completed the final designs for two pilot plants in FY 1983--the Stored Waste Examination Pilot Plant to examine and certify stored waste containers for the WIPP, and the Processing Experimental Pilot Plant to demonstrate processes for treating stored waste containers (Chart 42) that do not meet the WIPP criteria. In FY 1985 we are continuing construction on both pilot plants.

Other FY 1985 activities include: (1) completing process engineering studies required to certify remote handled wastes and transfer of the technology to the sites; (2) installing and testing a drum counter at Richland; (3) begin certifying newly generated remote handled waste at ORNL; and (4) continuing technology development and transfer for reduced waste generation at all sites.

LOW-LEVEL WASTE TECHNOLOGY

The Low-Level Waste (LLW) Technology program supports waste operations at DOE sites. In FY 1984 handbooks will document technologies for corrective measures for existing shallow land burial grounds, improved practices and procedures for operations for new shallow land burial grounds, and waste treatment options for use by generators and operators.

DOE has been developing an alternative to shallow land burial for potentially low-level waste. While these wastes fall within the definition of LLW, they may require greater isolation than that provided by shallow land burial due to their beta/gamma activity, heat, chemical toxicity, or if their physical size and shape would preclude WIPP waste acceptance certification. The Greater Confinement Disposal Test at the Nevada Test Site is evaluating a borehole concept (10 foot diameter, 120 feet deep) for special low-level waste. In FY 1984 cesium and strontium capsules have been emplaced in the Greater Confinement Disposal Test. In FY 1985 they will be monitored and predictive modeling will be developed.

AIRBORNE WASTE TECHNOLOGY

The Airborne Waste Technology program supports DOE operations in controlling and disposing gaseous and particulate effluents. In FY 1984 this program will be completed with a topical report on real-time effluent monitoring systems and a final closeout report of efforts accomplished in the program since its inception. In FY 1985 the orderly completion of a few program-related tasks will be performed under the low-level waste program.

TRANSPORTATION RESEARCH AND DEVELOPMENT

This program seeks to assure that safe, efficient, and reliable transportation will be available for defense nuclear wastes. Technology development, testing, and operational safety and accident analyses are conducted at the Transportation Technology Center at the Sandia National Laboratory in Albuquerque, New Mexico.

(Chart 43) In FY 1984 a prototype TRUPACT unit will be fabricated, and regulatory compliance testing will be performed. (Chart 44) The high-level waste cask final design will be completed and a prototype cask fabricator selected. Major components of the first production unit of the new shipping package for cesium and strontium capsules will be delivered and made available for use. We will evaluate the impacts of regulatory changes; develop standards for packaging; and maintain data bases on shipments, incidents, routing, emergency response, and state and local legislation.

In FY 1985 work will focus on research, development, and evaluation of nuclear materials transport systems to meet the Department's program requirements. This will include structural and thermal analysis and modeling, test environment characterization, testing facility development, transportation logistics and economic analysis on specific programs under development, analysis of State and local government transportation packaging legislation, analysis of IAEA Safety Series 6 impact on U.S. packaging, and accident assessment and risk analysis under various routing scenarios. The major effort in FY 1985 will center on the development of high-level and remote handled transuranic waste transportation systems.

TERMINAL STORAGE--WASTE ISOLATION PILOT PLANT

(Chart 45) The Waste Isolation Pilot Plant, now under development near Carlsbad, New Mexico, will provide a research and development facility to demonstrate the safe disposal of radioactive waste from national defense programs. WIPP is authorized by Public Law 96-164 and is exempt from licensing by the Nuclear Regulatory Commission.

The primary objectives of WIPP are to demonstrate, through a full-scale pilot plant, the technical and operational methods for permanent isolation of defense-generated transuranic radioactive waste and to provide a facility for experiments on the behavior of high-level waste in bedded salt. The facility is designed to receive, inspect, emplace, and store defense waste. It will have the capability of disposing of defense transuranic waste and conducting experiments with defense-generated high-level wastes. The construction of permanent surface and underground facilities started in July 1983 following an extensive exploratory program. This exploratory program included two large diameter shafts and mining over 2 miles of drifts (tunnels) to confirm the subsurface geology. Construction completion is scheduled for December 1986. A test and checkout period will follow with waste receiving operations targeted for October 1988.

Construction, which began in late-1983, will peak during FY 1984 and FY 1985. Enlarging the 6 foot diameter exploratory shaft to its final 19 foot diameter has started. Sinking the third shaft for facility ventilation has also started. Major contracts for constructing access roads, a rail spur, and a 31-mile water pipeline are in progress. The main waste handling building will be started in mid-1984.

With site characterization and site validation complete, Sandia research and development activities will emphasize in-situ experiments. These experiments and demonstrations will establish the technical basis for defense waste disposal in bedded salt. This work will be based on an extensive background of predictive model development and laboratory/field testing. Specific technology experiments will include:

- Thermal/structural interaction
- Operations demonstration
- Waste package performance

The experiments will be conducted in areas already mined during the exploratory program and in areas now being mined.

Good relations with the State of New Mexico are important in continuing construction of WIPP. Issues of concern to the State are being actively negotiated within the framework of the Consultation and Cooperation Agreement.

One primary State concern is the mission of WIPP. Our mission is limited to the demonstration of transuranic waste disposal and experiments with defense high-level waste. We are committed to removing this high-level waste upon completion of the experiments or decommissioning of the facility. This mission is consistent with Public Law 96-164, its Conference Report (House Report 96-702), and subsequent budget authorization legislation. We want to reemphasize that the WIPP facility is not being designed for the permanent disposal of high-level waste, nor has the site been characterized for such permanent disposal. Our site characterization program was directed toward the statutory mission of demonstration of disposal of transuranic waste and the high-level waste experiments.

On February 10, 1984, the Secretary directed that negotiations with the State of New Mexico continue so that a timely agreement will be reached which defines the WIPP mission within the bounds described above. When that agreement is complete, its content will be included in testimony before the appropriate committees of Congress.

The Administration is supporting the WIPP Project with a request for $87.5 million. FY 1985 will be a peak year of construction at the WIPP site. The last of 3 shafts, a 6-mile rail spur, 15 miles of access roads, and a 31-mile water pipeline will be completed. The primary waste handling building, started in FY 1984, will be under construction and completed in FY 1986. Assuming project activities continue successfully, as they have in the past, WIPP will be ready to receive radioactive waste on schedule in October 1988.

Byproducts and Beneficial Use

The objective of the byproducts and beneficial use program is to identify and develop safe, beneficial, and cost-effective applications of radioisotopes and materials from the defense fuel cycle. Also included is the development of power, light, heat, and electrical sources that are long-lived, reliable, and secure for our national defense needs. DOE-funded projects will be completed or terminated with funding from prior years. Specifically, the prior year funds for completion of the City of Albuquerque irradiator project will be made available to the City of Albuquerque. DOE commitments to provide continuing assistance to the City of Albuquerque will be reassessed. The operation of the transportable irradiator will be turned over to users, such as the U.S. Department of Agriculture, or terminated. Research using the Sandia irradiator and studies involving New Mexico State University will be completed and final reports issued. The shipping cask developed to economically transport cesium and strontium capsules from storage at Hanford will be available for lease. Pork and fruit pilot plant irradiators will be completed with prior year funds and turned over to users for pilot operation.

With regard to prototype power generators using the defense waste byproduct, strontium-90, fabrication of a high power 500 watt radioisotope thermoelectric generator (RTG) will be completed in FY 1984. In FY 1985 the RTG will be fueled and turned over to DOD for demonstration such as in the emergency shelter of the unmanned short-range radar station of the North Warning System. In FY 1984 tritium infrared assault landing lights were successfully used by the Joint Special Forces in the invasion of Grenada, and test and evaluation by the Alaskan Air Command established acceptable pilot runway light acquisition at distances of greater than 6 miles for C-130, A-10, and KC-135 aircraft (Chart 46). In FY 1985 previous developmental work in radioluminescent lighting (Chart 47) will be brought to conclusion, and future efforts turned over to the DOD, CIA, FAA, and the States of Alaska, Virginia, and Washington.

This completes my presentation. I shall be happy to answer questions.

CHART 1

DEFENSE PROGRAMS—NUCLEAR MATERIALS

FY 1985 BUDGET REQUEST
(DOLLARS IN MILLIONS)

	FY 1984 APPROP.	FY 1984 SUPPLEMENTAL APPROP. REQUEST	FY 1985 APPROP. REQUEST
MATERIALS PRODUCTION	$1,535.9	$85.8	$1,864.2
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT	$ 681.1	$ 0.0	$ 752.8

CHART 2

OBJECTIVE

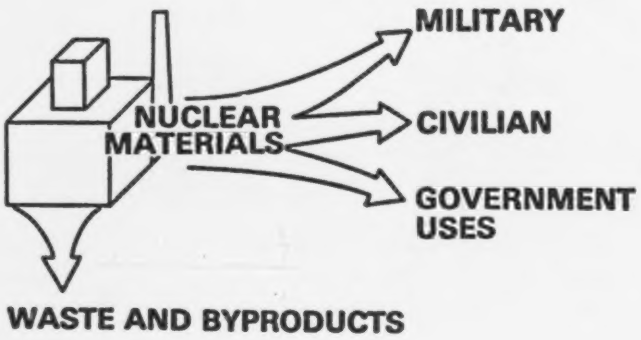

MILITARY
NUCLEAR MATERIALS
CIVILIAN
GOVERNMENT USES
WASTE AND BYPRODUCTS

CHART 3

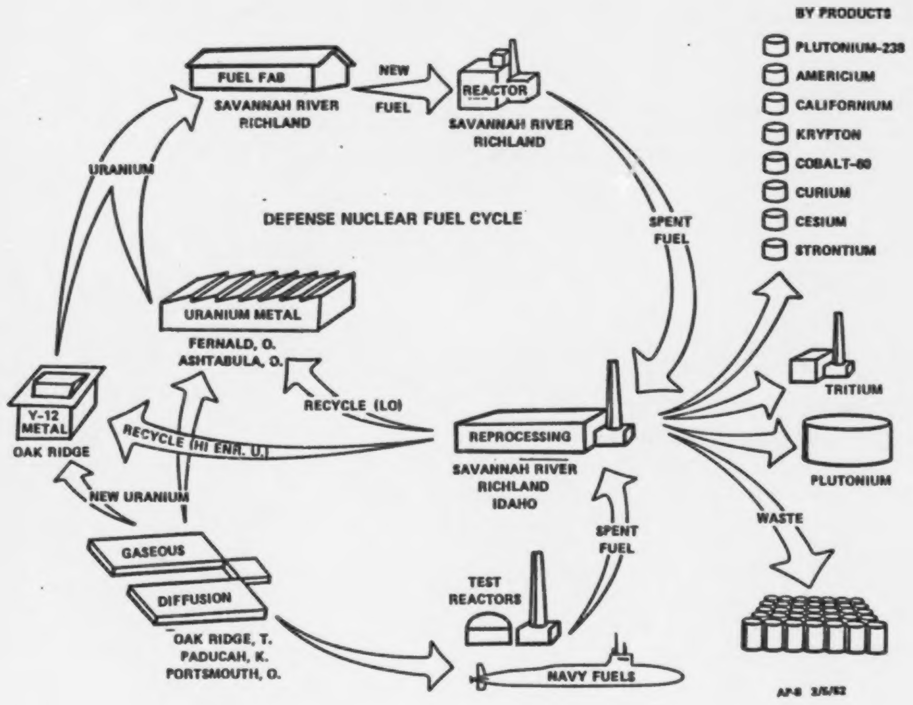

BY PRODUCTS
PLUTONIUM-238
AMERICIUM
CALIFORNIUM
KRYPTON
COBALT-60
CURIUM
CESIUM
STRONTIUM
FUEL FAB
SAVANNAH RIVER
RICHLAND
NEW
FUEL
REACTOR
SAVANNAH RIVER
RICHLAND
URANIUM
DEFENSE NUCLEAR FUEL CYCLE
SPENT
FUEL
URANIUM METAL
FERNALD, O.
ASHTABULA, O.
Y-12
METAL
OAK RIDGE
RECYCLE (LO)
RECYCLE (HI ENR. U.)
REPROCESSING
SAVANNAH RIVER
RICHLAND
IDAHO
TRITIUM
PLUTONIUM
NEW URANIUM
SPENT
FUEL
WASTE
GASEOUS
DIFFUSION
OAK RIDGE, T.
PADUCAH, K.
PORTSMOUTH, O.
TEST
REACTORS
NAVY FUELS
AP-8 3/5/82

CHART 9

NUCLEAR MATERIALS PRODUCTION
FY 1984 SUPPLEMENTAL REQUEST
(DOLLARS IN MILLIONS)

	TEC	REQUEST
WEAPONS SUPPORT		
OPERATING EXPENSES, OR		$ 0.5
84-D-136 ENRICHED URANIUM CONVERSION FACILITY, OR	$ 20.6	$ 4.4
		4.9
SECURITY		
OPERATING EXPENSES, SR		20.0
82-D-127 SAFEGUARDS IMPROVEMENTS, SR	34.6	9.9
84-D-134 SAFEGUARDS AND SECURITY IMPROVEMENT, SR	47.8	12.0
84-D-137 FACILITY SECURITY SYSTEMS UPGRADE, ID	10.0	2.0
		43.9
ENVIRONMENTAL		
OPERATING EXPENSES, SR		30.0
83-D-147 POLLUTION DISCHARGE ELIMINATION, SR	9.65	3.5
83-D-148 NONRADIOACTIVE HAZARDOUS WASTE MANAGEMENT, SR	22.1	3.5
		37.0
TOTAL NUCLEAR MATERIALS PRODUCTION		$85.8

CHART 10

NUCLEAR MATERIALS PRODUCTION
FY 1984 SUPPLEMENTAL REQUEST
WEAPONS SUPPORT

	APPROP.
OPERATING EXPENSES, OR • TO PREPARE DESIGN CRITERIA, PROJECT AND CONTRACT MANAGEMENT, QUALITY ASSURANCE, AND SAFETY PLANS	$0.5
84-D-136 ENRICHED URANIUM CONVERSION FACILITY MODIFICATIONS, OR • TEC $20.6 MILLION; FY 84 APPROP. $0 • RESTART DRY CHEMISTRY FACILITY AT Y-12 PLANT SHUTDOWN IN 1964 [Deleted]	4.4

CHART 11

SECURITY

	APPROP
OPERATING EXPENSES, SR ● NEW GUARD FORCE ● STUDIES AND EVALUATIONS	$20.0
82-D-127 SAFEGUARDS IMPROVEMENTS, SR ● TEC $34.6 MILLION; FY 84 APPROP. $7.0 MILLION [Deleted]	9.9
84-D-134 SAFEGUARDS AND SECURITY IMPROVEMENTS PLANTWIDE, SR ● TEC $47.8 MILLION; FY 84 APPROP. $0 [Deleted]	12.0
84-D-137 FACILITY SECURITY SYSTEMS UPGRADE, ID ● TEC $10.0 MILLION; FY 84 APPROP. $0 ● INITIATE DESIGN AND PROCUREMENT ACTIVITIES [Deleted]	2.0

CHART 12

NUCLEAR MATERIALS PRODUCTION
FY 1984 SUPPLEMENTAL REQUEST
ENVIRONMENTAL

	APPROP.
OPERATING EXPENSES, SR	$30.0
• FUEL FABRICATION AREA SEEPAGE BASIC PHASE-OUT DEMONSTRATION PROJECT ($15.0 MILLION)	
– REMOVE HAZARDOUS CONSTITUENTS FROM WASTE STREAM	
– ALLOW DISCHARGE TO SURFACE WATERS IN ACCORD WITH NPDES	
• GROUNDWATER CONTROL ACTIVITIES ($15.0 MILLION)	
– NOT IN FULL COMPLIANCE WITH CLEAN WATER ACT	
– SOME GROUNDWATER CONTAMINATED	
– DECONTAMINATE GROUNDWATER IN M-AREA	
– GROUNDWATER CONTAMINATION INVESTIGATION	
83-D-147 POLLUTION DISCHARGE ELIMINATION	3.5
• TEC $9.65 MILLION; FY 84 APPROP. $2.0 MILLION	
• CONTROL LIQUID EFFLUENTS	
• ADVANCES COMPLETION 9 MONTHS	
83-D-148 NONRADIOACTIVE HAZARDOUS WASTE MANAGEMENT	3.5
• TEC $22.1 MILLION; FY 84 APPROP. $3.0 MILLION	
• TREAT AND DISPOSE OF HAZARDOUS WASTES	
• ADVANCES COMPLETION BY 6 MONTHS	

CHART 13

FY 1985 BUDGET REQUEST
BUDGET SUMMARY
(DOLLARS IN MILLIONS)

	FY 1984 APPROP.	FY 1985 APPROP.
BASE ACTIVITIES		
CURRENT OPERATIONS	$ 933.6	$1,105.0
L REACTOR	64.5	65.0
PUREX	88.7	90.8
SECURITY	102.1	96.8
ENVIRONMENTAL	59.3	58.1
SUBTOTAL	$1,248.2	$1,415.7
PRODUCTION INITIATIVES		
RESTORATION	$ 107.6	$ 84.5
IDAHO RESTORATION	5.5	14.1
PRODUCTIVITY IMPROVEMENTS	25.3	50.7
MARK 15 CORES	4.0	113.5
SPECIAL ISOTOPE SEPARATION	71.9	39.0
PROCESS FACILITY MODIFICATION	12.5	0.0
REACTOR SAFETY	26.7	25.7
SUBTOTAL	$ 253.5	$ 327.5
OTHER		
NAVAL REACTOR SUPPORT	$ 120.0	$ 121.0
TOTAL MATERIALS PRODUCTION	$1,621.7	$1,864.2

CHART 14

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
BASE ACTIVITIES

- OPERATE THREE SAVANNAH RIVER REACTORS TO PRODUCE 3 PERCENT PU-240 PLUTONIUM AND TRITIUM
- OPERATE L REACTOR AT SAVANNAH RIVER
- OPERATE RICHLAND N REACTOR TO PRODUCE WEAPON-GRADE PLUTONIUM AND BY-PRODUCT STEAM
- OPERATE TWO PROCESSING CANYONS AT SAVANNAH RIVER TO RECOVER PLUTONIUM AND TRITIUM
- OPERATE PUREX PROCESSING PLANT AT RICHLAND
- OPERATE IDAHO CHEMICAL PROCESSING PLANT TO PROCESS NAVY, R&D, AND OTHER SPENT FUELS
- OPERATE FEED PRODUCTION PLANTS AT FERNALD AND ASHTABULA, OHIO, AND OAK RIDGE, TENNESSEE
- CONTINUE ACTIVITIES TO SUPPORT THE PRODUCTION AND PROCESSING OF NUCLEAR MATERIALS
- CONTINUE PRIOR YEAR CONSTRUCTION PROJECTS
- BEGIN TWO NEW CONSTRUCTION PROJECTS TO PROVIDE A MORE EFFICIENT PROCESS TO PRODUCE REACTOR FUEL TUBES AT SR AND TO CENTRALIZE URANYL NITRATE CONVERSION OPERATIONS [Deleted]

CHART 15

NEW PRODUCTION REACTOR (NPR)

- NPR WOULD PROVIDE ASSURED SUPPLY OF TRITIUM VITAL TO MAINTAINING NUCLEAR WEAPONS STOCKPILE
- NPR STUDIES UNDERWAY TO SUPPORT REACTOR CONCEPT/SITE SELECTION BY MID FY 1985 FOR RECOMMENDATION TO PRESIDENT

CHART 16

DEFENSE PROGRAMS—NUCLEAR MATERIALS

NEW PRODUCTION REACTOR

- COST ESTIMATES
  - CONDUCT PRE-CONCEPTUAL DESIGN STUDIES
  - DEVELOP ASSOCIATED CONCEPT & SUPPORT FACIL. COSTS
  - DETERMINE LIFECYCLE & PRODUCT UNIT COSTS
  - PROVIDE PROJECT/MANAGEMENT PLANS
- SYSTEMS ENGINEERING
  - DEFINE FUNCTIONAL & OPERATIONAL CHARACTERISTICS OF SUPPORT FACILITIES
  - SUPPORT CRITICAL REACTOR TECHNOLOGY R&D
- SAFETY STUDIES
  - DEVELOP SOURCE TERMS
  - EVALUATE CONCEPTS & SUPPORT FACILITIES
  - EVALUATE COMPONENT OPERABILITY & AVAILABILITY
  - DEFINE SAFETY MARGINS & DEVELOP MODELS
- ENVIRONMENTAL STUDIES
  - GATHER ENVIRONMENTAL DATA TO SUPPORT FUTURE NEPA DOCUMENTATION
  - PLACE ENVIRONMENTAL STUDIES CONTRACT WITH OPTION FOR EIS PREPARATION
- PREPARATION OF ENVIRONMENTAL REPORT

CHART 17

L REACTOR UPGRADE

- L REACTOR WAS UPGRADED TO EQUIVALENT STATUS OF THREE OPERATING REACTORS AT SR
- REACTOR UPGRADE COMPLETED ON SCHEDULE OCTOBER 1983
- REACTOR UPGRADE COSTS WERE $190 MILLION
- CURRENT STATUS
  - PUBLIC LAW 98-50 AND COURT ORDER REQUIRES COMPLETION OF EIS BEFORE RESTART
  - PUBLIC LAW 98-50 REQUIRES OBTAINING NPDES PERMIT BEFORE RESTART
  - DRAFT EIS ISSUED 9/83
  - FINAL EIS SCHEDULED 4/84
  - NPDES PERMIT BEING NEGOTIATED WITH SOUTH CAROLINA

CHART 18

DEFENSE PROGRAMS — NUCLEAR MATERIALS

SECURITY PROJECTS

- FY 1985 REQUEST OF $35.8M CONTINUES CONSTRUCTION OF SECURITY PROTECTIVE SYSTEMS & FACILITIES AT RL, SR, & ID
- RL PROJECTS 85-D-136 (TEC $3.3M), COMPONENTS PROTECTION SYSTEM AT N RX & 85-D-137 (TEC $4.4M), VAULT SAFETY SPECIAL NUCLEAR MATERIAL INVENTORY SYSTEM
  - $5.8M FUNDING [Deleted]
- SR PROJECTS 84-D-134 (TEC $47.8M), PLANT WIDE SAFEGUARDS & SECURITY IMPROVEMENTS & 82-D-127 (TEC $34.6M) SAFEGUARDS IMPROVEMENTS
  - $21.6M FUNDING [Deleted]
- ID PROJECTS 84-D-137 (TEC $10M), FACILITY SECURITY SYSTEMS UPGRADE AND 82-D-128 (TEC $5.4M) PLANT PERIMETER SECURITY SYSTEMS UPGRADE
  - $8.4M FUNDING [Deleted]

CHART 19

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST

ENVIRONMENTAL PROTECTION UPGRADES AT SR (FY 84 & FY 85)

- GROUNDWATER CONTAMINATION INVESTIGATION INCLUDING MONITORING WELLS
- FUEL FABRICATION AREA
  - DECONTAMINATION OF GROUNDWATER
  - EFFLUENT TREATMENT FACILITIES
  - DECOMMISSIONING OF SEEPAGE BASIN
- DEFINITION OF SRP GEOHYDROLOGY
- COMPREHENSIVE COOLING WATER STUDIES
- DECOMMISSIONING OF VARIOUS HAZARDOUS WASTE SITES
- REPROCESSING AREA EVALUATIONS
  - EFFLUENT TREATMENT FACILITIES
  - DECOMMISSIONING OF SEEPAGE BASIN

CHART 20

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST

FACILITY RESTORATION PROGRAM

- PROGRAM OBJECTIVE IS TO CORRECT ACCUMULATED DEFICIENCIES TO RESTORE THE OPERATING CAPABILITIES OF THE PRODUCTION COMPLEX
- TOTAL PROGRAM COST, EXCLUDING IDAHO, IS $462 MILLION FUNDED OVER 6 YEARS
- FY 1985 FUNDING REQUEST IS $84.5 MILLION AUTHORIZATION AND APPROPRIATION
  - $72.8 MILLION PROJECT 82-D-124
  - $11.7 MILLION OPERATING EXPENSE
- THROUGH FY 1984 CONGRESS HAS AUTHORIZED AND APPROPRIATED $315 MILLION FOR THIS PROGRAM

CHART 21

IDAHO FUEL PROCESSING RESTORATION
(PROJECT 85-D-139)

- REQUIRED BY 1992 TO PROCESS PLANNED RECEIPTS OF NAVAL REACTORS SPENT FUEL
- RECOVERED HIGHLY ENRICHED URANIUM PROVIDES PRINCIPAL SOURCE OF FUEL FOR SR REACTORS
- PROVIDES THE MOST COST-EFFECTIVE ALTERNATIVE FOR MEETING NAVAL FUEL RECEIPT REQUIREMENTS AND FUELING SR REACTORS BASED ON CURRENT COST/BENEFIT ANALYSES
- RESTORES AGING PILOT PLANT BUILT IN 1951 TO DEMONSTRATE NAVY FUEL PROCESSING CAPABILITY
- PRELIMINARY PROJECT TEC $230M — FY 1985 REQUEST $10M FOR DESIGN

CHART 22

SR FUEL IMPROVEMENT PROGRAM

- U-236 BUILDUP IN SRP REACTOR FUEL REDUCES PRODUCTION EFFICIENCY
- PSP TECHNOLOGY PROVIDES COST-EFFECTIVE MEANS FOR REMOVING U-236, RESTORING PRODUCTIVITY, AND REDUCING REQUIREMENTS FOR NEW HIGHLY ENRICHED URANIUM
- COST/BENEFIT ANALYSIS INDICATES PAYBACK IN 4 YEARS

CHART 23

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST

MARK-15 (SR CORES)

(Dollars in Millions)

	FY 1983	FY 1984	FY 1985
	BA	BA	BA
MARK-15	$18.7	$4.0	$ 23.0
URANIUM ENRICHING	0	0	90.5
TOTAL	$18.7	$4.0	$113.5

- MARK-15 CORES INCREASE PU EQ. PRODUCTION

[Deleted]

- UNIT COSTS OF PU PRODUCED

[Deleted]

- FY 1985 FUNDING PROVIDES FOR PURCHASE OF SEU FROM GASEOUS DIFFUSION PLANTS, COMPLETION OF FACILITY STORAGE MODIFICATIONS, AND INITIATION OF PRODUCTION OF MARK-15 CORES AT OR AND SR
- PARTIAL CONVERSION OF SR REACTORS PLANNED FOR FY 1986

CHART 24

SPECIAL ISOTOPE SEPARATION PROGRAM SUMMARY

- AVLIS PROCESS SELECTED FOR PRODUCTION PROTOTYPE — FY 1983

[Deleted]

- DOE/OSTP TECHNICAL REVIEW — FY 1984
- AVLIS INTEGRATED EQUIPMENT PROCESS DEMONSTRATION — FY 1987
- PRODUCTION PROTOTYPE OPERATION — FY 1989 (ONE YEAR DELAY)
- FULL PRODUCTION CAPABILITY — FY 1991 (ONE YEAR DELAY)

CHART 25

PROCESSING FACILITIES MODIFICATIONS

[Deleted]

- ADDS [Deleted] DISSOLUTION CAPABILITY TO PUREX
- REQUIRED FOR PROCESSING DOE-OWNED PU-BEARING FUELS, E.G., FFTF (FFTF FUEL CONTAINS OVER 3 MT OF DEFENSE PROGRAMS ORIGIN FUEL GRADE PU VALUED AT MORE THAN $1.2 BILLION)
- FACILITY DESIGN AND EQUIPMENT ENGINEERING INITIATED FY 1984
- NO ADDITIONAL FUNDING REQUESTED IN FY 1985. PROJECT COMPLETION BEING DELAYED 1 YEAR CONSISTENT WITH SIS DELAY. PFM RECOVERED PU COULD BE UTILIZED FOR BLENDING IN THE LONG TERM WITHOUT SIS.
- TEC $155 MILLION

CHART 26

REACTOR SAFETY

- FY 1985 BUDGET INCLUDES $14.4 MILLION OPERATING AND $11.3 MILLION CONSTRUCTION
- OPERATING FUNDING PROVIDES:
  - REACTOR OPERATOR TRAINING AT SR AND RL
  - REACTOR SIMULATOR DEVELOPMENT AT RL
  - MODIFICATIONS TO SR AND RL REACTORS TO REDUCE THE RISK OF ACCIDENTS
- PROJECT 82-D-126, REACTOR SAFETY AND RELIABILITY, TEC $40.6 MILLION
  - RL — $5.5 MILLION FOR EMERGENCY SHUTDOWN PANEL AND CONTROL ROOM ISOLATION
  - SR — $5.8 MILLION FOR COMPLETING REACTOR SIMULATOR TRAINING FACILITY AND REMOTE DETECTION AND CONTROL CAPABILITY

CHART 27

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
NEW CONSTRUCTION PROJECTS
(DOLLARS IN MILLIONS)

		TEC	BA
85-D-131	GENERAL PLANT PROJECTS, VL	$32.0	$32.0
85-D-132	PLANT ENGINEERING AND DESIGN	2.0	2.0
85-D-136	COMPONENTS PROTECTION SYSTEM, 100-N AREA, RL	3.3	3.3
85-D-137	VAULT SAFETY SNM INVENTORY SYSTEM, RL	4.4	2.5
85-D-139	FUEL PROCESSING RESTORATION, IFPF, ID	10.0*	10.0
85-D-140	PRODUCTIVITY AND RADIOLOGICAL IMPROVEMENTS, FMPC, OR	47.0	6.0
85-D-142	U_3O_8 FUEL TUBE FACILITIES, SR	15.5	8.0
85-D-145	URANYL NITRATE TO OXIDE CONVERSION FACILITY, SR	1.8*	1.8
	TOTAL NEW CONSTRUCTION PROJECTS		$65.6

*PARTIAL DESIGN ONLY.

CHART 28

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST
CONTINUING CONSTRUCTION PROJECTS

(DOLLARS IN MILLIONS)
(CONTINUED)

		TEC	THRU FY 1984	FY 1985
			B/A	B/A
83-D-148	NON-RADIOACTIVE HAZARDOUS WASTE MGMT, SR	$ 22.1	$ 7.5	$ 11.5
83-D-180	FACILITY STORAGE MODIFICATIONS, VL	15.8	9.3	6.5
82-D-124	RESTORATION OF PRODUCTION CAPABILITIES, PHASE II, III, IV, AND V, VL	367.3	231.8	72.8
82-D-126	REACTOR SAFETY AND RELIABILITY, VL	40.6	27.5	11.3
82-D-127	SAFEGUARDS IMPROVEMENTS, SR	34.6	27.9	6.7
82-D-128	PLANT PERIMETER SECURITY SYSTEMS UPGRADE, ID	5.4	5.0	0.4
82-D-136	FUEL PROCESSING FACILITIES UPGRADE, ID	46.0	45.0	1.0
82-D-201	SPECIAL PLUTONIUM RECOVERY FACILITIES, SR	65.8	37.0	28.8
				$176.3

(DOLLARS IN MILLIONS) CHART 29

		TEC	THRU FY 1984	FY 1985
			B/A	B/A
84-D-130	MODIFICATIONS PROCESSING FACILITY SUBSTATIONS, SR	$ 5.8	$ 5.6	$ 0.2
84-D-134	SAFEGUARDS AND SECURITY IMPROVEMENTS, PLANT-WIDE, SR	47.8	12.0	14.9
84-D-135	PROCESS FACILITY MODIFICATIONS, RL	155.0	7.5	0.0
84-D-136	ENRICHED URANIUM CONVERSION FACILITY MODIFICATIONS, Y-12 PLANT, OR	20.6	4.4	8.0
84-D-137	FACILITY SECURITY SYSTEMS UPGRADE, IFPF, ID	10.0	2.0	8.0
83-D-146	WATER POLLUTION CONTROL, OR	9.5	5.4	4.1
83-D-147	POLLUTION DISCHARGE ELIMINATION, SR	9.7	6.5	2.1

CHART 30

NUCLEAR MATERIALS PRODUCTION
FY 1985 BUDGET REQUEST HIGHLIGHTS

- CONTINUES CURRENT PRODUCTION BASE ACTIVITIES IN FY 1985
- SUPPORTS PRODUCTION INITIATIVES BEGUN IN PREVIOUS YEARS
  - FUNDS FACILITIES RESTORATION PROGRAMS, INCLUDING IDAHO
  - FUNDS FIRST FULL YEAR OF PUREX OPERATIONS
  - FUNDS FIRST YEAR OF L REACTOR OPERATION AT SAVANNAH RIVER
  - CONTINUES MARK 15 ACTIVITIES
  - CONTINUES SPECIAL ISOTOPE SEPARATION R&D
  - CONTINUES NEW PRODUCTION REACTOR STUDIES
- FUNDS URANIUM ENRICHING SERVICES FOR MATERIALS PRODUCTION AND NAVAL REACTORS
- FUNDS PRIORITY SECURITY AND ENVIRONMENTAL ACTIVITIES

CHART 31

DEFENSE PROGRAMS
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

HIGH-LEVEL WASTE AND TRANSURANIC WASTE STORAGE SITES

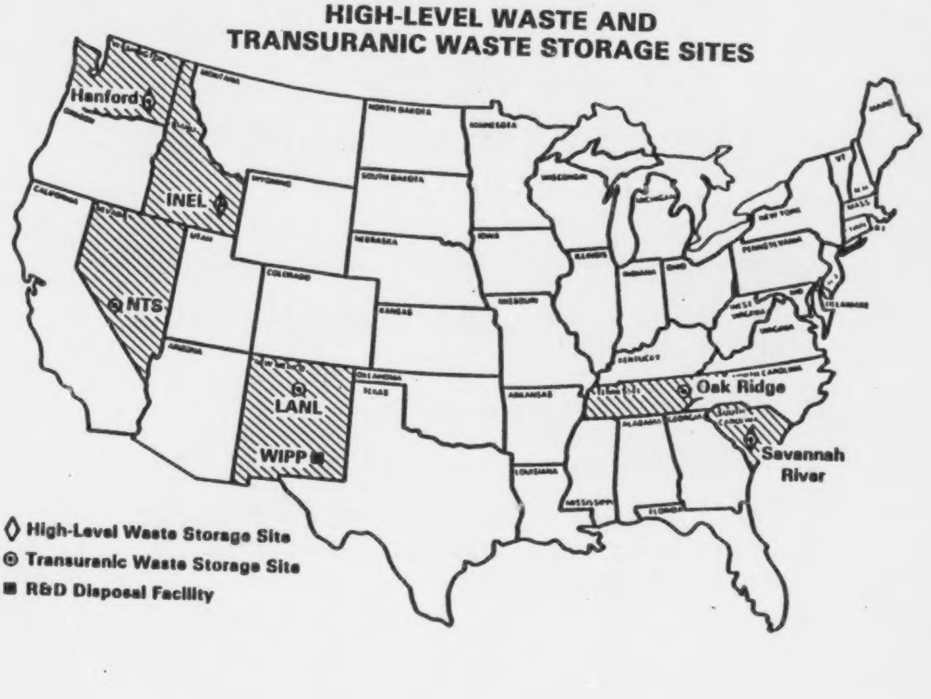

Hanford
INEL
NTS
LANL
WIPP
Oak Ridge
Savannah River
◊ High-Level Waste Storage Site
⊙ Transuranic Waste Storage Site
■ R&D Disposal Facility

CHART 32

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

Defense Waste Inventory

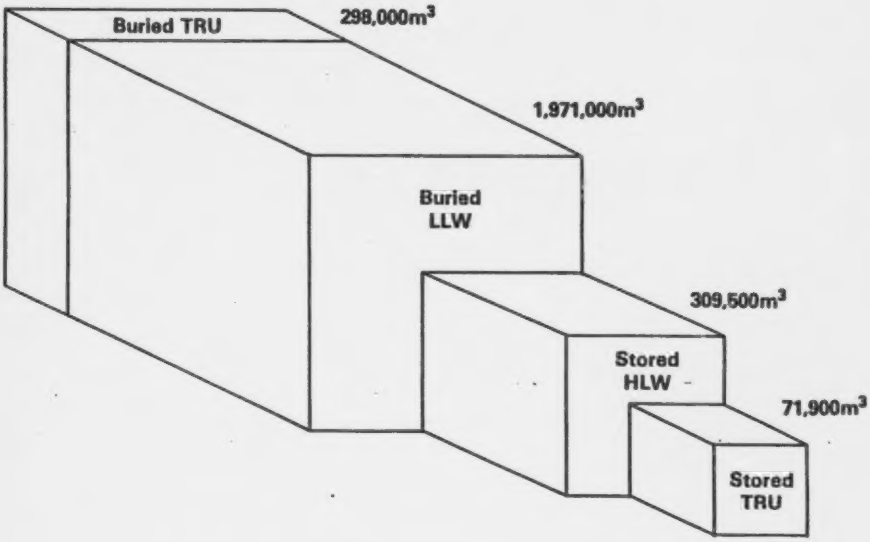


CHART 33

DEFENSE WASTE MANAGEMENT PLAN DISPOSAL STRATEGY

- READILY RETRIEVABLE WASTE TO GEOLOGIC DISPOSAL
- ALL OTHER TO BE RETRIEVED IF BENEFITS JUSTIFY COSTS AND RISKS
- OTHERWISE: STABILIZE IN PLACE
- RETRIEVED TRU WILL BE MADE ACCEPTABLE TO WIPP
- IMMOBILIZED HIGH LEVEL WASTE TO COMMERCIAL REPOSITORY BARRING ADVERSE IMPACTS ON DEFENSE PROGRAMS

CHART 34

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE HIGH-LEVEL WASTE

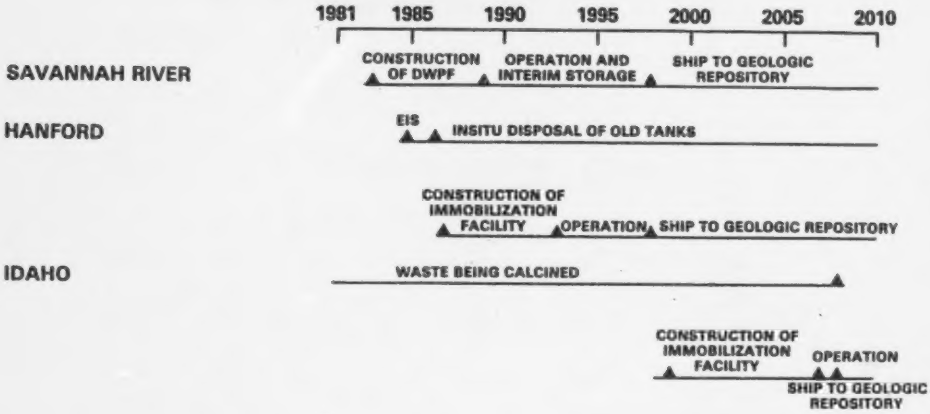
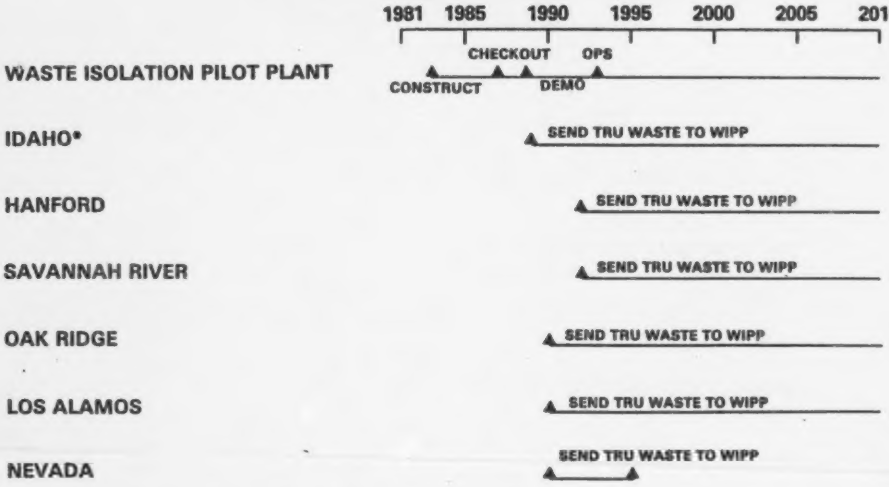


CHART 35

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE TRANSURANIC WASTE



*THE NEPA PROCESS FOR SHIPMENT OF STORED INEL TRANSURANIC WASTE TO THE WIPP HAS BEEN COMPLETED.

CHART 36

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

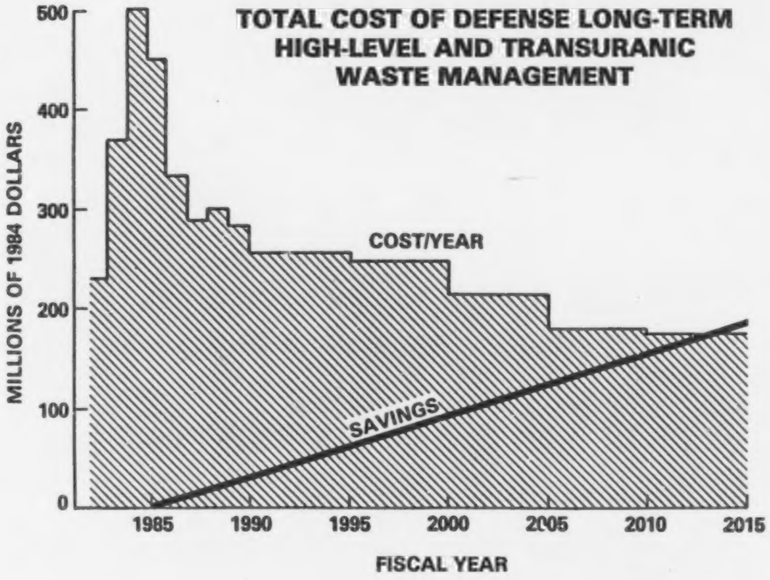


CHART 37

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT FY 1985 BUDGET REQUEST (BA IN MILLIONS)

	FY 1984 APPROP.	FY 1985 APPROP.
INTERIM WASTE OPERATIONS	$314.0	$329.0
LONG-TERM WASTE MANAGEMENT TECHNOLOGY	211.3	334.2
(DEFENSE WASTE PROCESSING FACILITY)	(159.8)	(267.7)
TERMINAL STORAGE (WIPP)	137.7	87.5
BYPRODUCTS AND BENEFICIAL USE	15.6	0
PROGRAM DIRECTION	2.5	2.1
TOTAL	$681.1	$752.8

CHART 43

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

TRUPACT (TRUCK VERSION) PRELIMINARY DESIGN

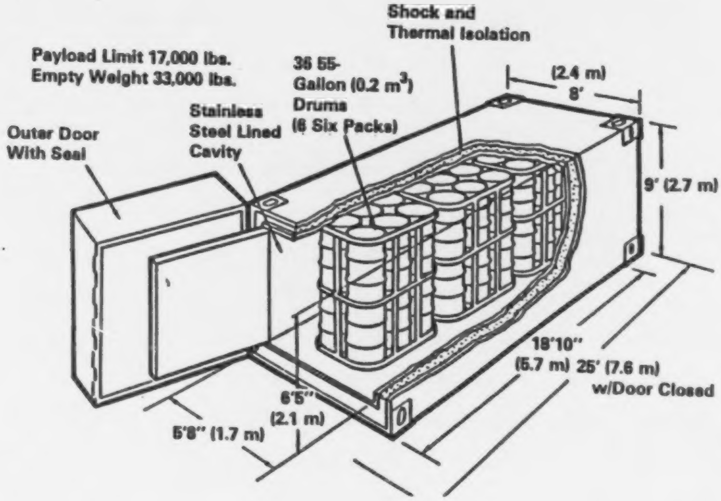
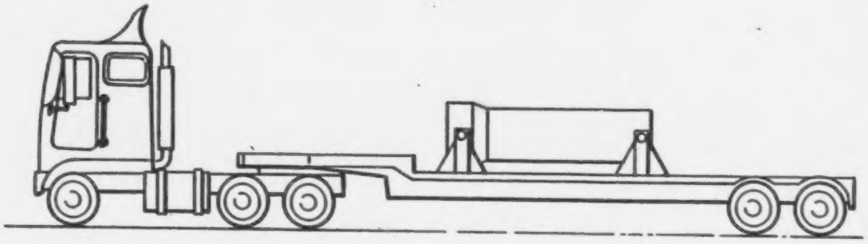

Shock and Thermal Isolation
Payload Limit 17,000 lbs.
Empty Weight 33,000 lbs.
36 55-Gallon (0.2 m^3) Drums (6 Six Packs)
(2.4 m) 8'
Stainless Steel Lined Cavity
Outer Door With Seal
9' (2.7 m)
18'10" (5.7 m)
25' (7.6 m) w/Door Closed
6'5" (2.1 m)
5'8" (1.7 m)

CHART 44

TRANSPORTATION SYSTEM WEIGHTS — DHLW TRUCK CASK



STATEMENT OF JAMES W. CULPEPPER

Mr. Chairman and Members of the Committee, it is indeed a pleasure to appear before you today to address the Department of Energy's Security Affairs programs of Nuclear Safeguards and Security (including Classification), Security Investigations, and Verification and Control Technology and the Fiscal Year 1985 request and the Fiscal Year 1984 supplemental request required to carry out these important activities.

The programs I will discuss with you today play a critical role in fulfilling the national security mission of the Department. They contribute significantly to preventing the theft or sabotage of nuclear weapons, materials, facilities, and classified information; developing and implementing policy for the classification and declassification of information; providing nuclear weapons systems expertise to the Intelligence Community; controlling proposed exports of nuclear materials and equipment; and providing the technology and equipment necessary to monitor treaty compliance of foreign nuclear weapons programs.

SECURITY AFFAIRS

As Mr. Morgan stated in his opening remarks, as the Deputy Assistant Secretary for Security Affairs, I am responsible to him for the direction and management oversight of the Security Affairs activities of the Department.

Here with me today are: Mr. Ralph Caudle, Director, Office of Safeguards and Security; Dr. Julio Torres, Director, Office of International Security Affairs; and Mr. Robert Duff, Director, Office of Classification. All three individuals would be pleased to answer any questions you or the members of the Committee might have. Also here with us today is Mr. Charles Boykin, who was recently appointed the Deputy Assistant Secretary for Intelligence.

DELETED

accordingly, I will cover intelligence matters in my presentation today. Mr. Boykin will be happy to answer any questions you may have regarding our intelligence activities.

With the Chairman's permission, I will submit my formal statement for the record. I would then like to make a presentation which covers the Department's safeguards and security activities, highlights some of Security Affairs program activities, and discusses the funding requested in the President's Fiscal Year 1985 budget and the Fiscal Year 1984 supplemental request. You each have copies of my formal statement and the viewgraphs I will use today.

FISCAL YEAR 1985 BUDGET

The overall funding requirement in Fiscal Year 1985 for Security Affairs' programs is $173.4 million. This consists of $62.7 million for Nuclear Safeguards and Security (including $3.9 million for Classification), $34.0 million for Security Investigations, and $76.7 million for Verification and Control Technology. I will now briefly discuss each of the Security Affairs programs.

NUCLEAR SAFEGUARDS AND SECURITY

The Nuclear Safeguards and Security program has three major program goals. These are:

- to prevent the unauthorized disclosure, theft, sabotage, or loss of nuclear materials, facilities, and classified information;
- to provide a base of safeguards and security technology and information which can be used to protect Department of Energy facilities, and control and account for nuclear weapons, materials, and classified information; and
- to strengthen international safeguards and physical security to deter the diversion of nuclear materials and support non-proliferation and national security.

Before discussing some of our accomplishments during the past year, it is appropriate to make a more general statement about our Nuclear Safeguards and Security program. I think we are passing through a period of transition and progress based on a more systematic and direct approach to the safeguards and security programs of each Department of Energy field office. Today, in addition to meeting the requirements of all Department of Energy orders and directives, the effectiveness of each site's safeguards and security program is measured in terms of the total program's responsiveness to precluding the possibility of a successful malevolent act. We closely examine the overall effectiveness by onsite evaluations of the key elements of the program (physical protection, material control and accountability, technical security, and personnel security) to successfully address and counter the perceived threat to a given facility.

We now routinely conduct exercises DELETED of the key security elements, including particularly complex reviews of guard force performance under simulated attack and fire as a major component of our current approach. This process is working extremely well and, as a result, both near-term and long-range system enhancements are being realized at an accelerated pace.

ACCOMPLISHMENTS

The accomplishments of the past year result from the major commitment of Secretary Hodel and the Department to quickly and effectively improve the safeguards and security posture at our most critical facilities. These include: significant initiatives to enhance the effectiveness of our protective forces; improved weapons and equipment capabilities; and facilitation of ratification procedures relating to onsite military assistance during a terrorist incident.

The Secretary has recently approved the concept of an enhanced Inspection and Evaluation program that will provide for more frequent and more comprehensive evaluations of the Department's field offices and key facilities.

Work is progressing on development of airspace restrictions over nine critical facilities. The formal rulemaking process began with a February 8, 1984, Federal Register notice, and a public hearing was held on March 13.

During the past year, we also have developed safeguards and security plans for all our major facilities. These plans are used as a baseline against which we measure our progress in meeting outstanding safeguards and security requirements.

The groundwork has been completed for the establishment of a Central Training Facility at Kirtland Air Force Base in New Mexico to meet the needs of both security inspectors and mid- and senior-level

Departmental representatives, and we are moving through the approval process to establish that facility.

With the Office of Safeguards and Security's assistance the Department has established a policy requiring the Department's contractors and potential contractors to report any foreign ownership, control, or influence on their operations. An assessment of each firm's foreign relationships is now made to determine whether a risk to the national security exists. If a national security risk does exist, contracts can be terminated or contract bids denied.

Underscoring all of the above efforts is the concept of corporate commitment--on the part of both Department of Energy officials and officials of major contractor organizations--to the Department's safeguards and security mission. The importance of corporate commitment in accomplishing existing and future safeguards and security improvements cannot be overstated. We have reassured ourselves of this commitment from our major nuclear facilities' contractors.

I would now like to move on and discuss the activities and budget request for the five elements of the Nuclear Safeguards and Security program. These include: safeguards and security operations, technology development, international safeguards, classification, and program direction.

SAFEGUARDS AND SECURITY OPERATIONS

Specific safeguards and security operations activities include: direct assistance to Departmental field operations for physical protection systems improvements; oversight and operation of the nuclear materials management and safeguards system, which provides timely data on nuclear materials production, utilization, tracking, and storage; and the operation of the New Brunswick Laboratory, which carries out safeguards analysis tasks at Argonne, Illinois. A major objective of the safeguards and security operations element is to assist Department of Energy operating contractors in designing and applying safeguards and security technology in order to ensure the implementation of cost-effective, site-specific, physical protection systems. At the heart of this program is the continued need to provide field elements with timely information on advanced hardware and technology to mitigate the threats to the Department's activities and resources. The Department's sites vary from dated large nuclear materials production reactors, large uranium enrichment plants, and one-of-a-kind weapon production sites to new facilities, such as the Fuels and Materials Examination Facility. Also, some of our facilities are located on the Nevada Test Site, where onsite guard forces and protection systems DELETED

In Fiscal Year 1985, major efforts will be expended to ensure the application of technology that has been developed in the Nuclear Safeguards and Security program to upgrade protective activities and to DELETED Based on comprehensive vulnerability analyses at selected Department of Energy sites, we will be implementing systems incorporating technological advances in access denial, intrusion detection and assessment, integrated security communications, entry control, and materials control and accounting. Personnel and materials control and assessment systems will be installed at production reactors and material processing facilities to counter potential sabotage and diversion threats by insiders.

Through guidance and technology, we will improve our capabilities to neutralize attempts to interfere with the Department's communications or to penetrate information processing systems. Activities will include the assessment of field operations to determine the existence of vulnerabilities to hostile intelligence efforts, the development of advanced audio surveillance and suppression methods, and the continuation of developmental activities and training for improved security of classified computer operations.

As previously mentioned, we are in the process of strengthening our inspection and evaluation function. Staff increases are planned along with an accelerated schedule and more comprehensive inspections of safeguards and security operations at the Department's field activities. Continued emphasis on this program and our followup efforts are critical if we are to DELETED maintain a properly balanced and successful safeguards and security program.

Technologically advanced special weapons and tactics training, with a particular focus on realistic combat situations, has become a critical ingredient in improving the capabilities of our protective forces at each of our facilities. To ensure the effectiveness of this training, in terms of consistency and uniformity, we are in the process of obtaining Departmental approval to begin operation of the safeguards and security Central Training Facility in Albuquerque, New Mexico. Enhanced guard force tactical training and testing techniques will be implemented and evaluated and be supplemented with a detailed curriculum on various aspects of physical security. The transfer of information on technological advancements for various safeguards and security disciplines will also be provided at the Central Training Facility.

We will continue to operate our Nuclear Materials Management and Safeguards System, the Nation's single nuclear materials computerized data base for recording the shipment of nuclear materials to and from foreign countries. Each year, approximately 78,000 nuclear material transactions (e.g., shipments, receipts, and inventory changes from 93 contractors and 1,400 licensees) are entered into this system.

We will also continue direct support to the New Brunswick Laboratory, which serves as the United States Government's safeguards analytical laboratory and provides materials and services to the Department of Energy, the Nuclear Regulatory Commission, and other Government agencies, as well as to commercial, industrial, and foreign organizations. The laboratory's measurement, reference material standards, and inventory verification services fulfill safeguards requirements essential for the control and accounting of nuclear materials.

TECHNOLOGY DEVELOPMENT

Technological development is an integral part of our safeguards and security program since advanced technology is necessary for improved protection systems for our nuclear facilities. Research and development as conducted by the national laboratories provides us with a technological base to be used in safeguards in the Department's nuclear facilities and to assist the Nuclear Regulatory Commission and its licensees. Efforts are directed towards the development and testing of new technology components and systems for entry control, intrusion detection, explosives detection, use-denial, and detection-surveillance assessment for airborne intrusion to increase our effectiveness against threats.

The Fiscal Year 1985 activities include planned improvements for the control and accounting of nuclear material. These activities include projects to measure specific nuclear materials that are inherently difficult to measure, such as materials that are inside processing equipment which are, therefore, inaccessible for measurement by conventional methods. Also in Fiscal Year 1985, field demonstrations will be conducted on measurement techniques that can be used nondestructively and remotely and, thus, contribute to safe operations and provide efficient measurement for highly irradiated reprocessing dissolved solutions at the Idaho, Richland, and Savannah River facilities.

Our research and development activities are closely coordinated with ongoing development efforts of the Nuclear Regulatory Commission and the Department of Defense to ensure that advanced technology is routinely transferred among each entity to assist each agency's protection efforts. We routinely explore the feasibility of joint research efforts to reduce the cost of such activities to each agency and the United States Government.

INTERNATIONAL SAFEGUARDS

Our international safeguards program supports United States nonproliferation initiatives and is scoped to improve the effectiveness of the International Atomic Energy Agency. The program for Fiscal Year 1985 includes developing safeguards for application at the new Gas Centrifuge Enrichment Plant at Portsmouth, Ohio, which will be inspected by the International Atomic Energy Agency. Also, we will continue to develop procedures and instrumentation for safeguarding spent fuel reprocessing plants and to train foreign personnel to perform safeguards and security functions in their own countries in accordance with the provisions of the

Nuclear Non-Proliferation Act of 1978. We will also be developing and testing alternative designs for a fiber optical security seal that can be verified while still attached to the object being protected, rather than having to be transmitted to Vienna, Austria, for verification.

Compliance with international agreements and nonproliferation objectives requires tracking international shipments of United States materials and shipments of foreign materials in the United States. Continuing activities will include recording exports, imports, and transfers of materials of foreign origin in the United States; reporting to the International Atomic Energy Agency under the United States/International Atomic Energy Agency Agreement; and determining inventories of nuclear materials for bilateral agreements.

CLASSIFICATION

The goals of our Classification program are to: provide Department-wide guidance on classification and declassification policies and procedures; to develop and update classification guides for the nuclear weapons program and other classified areas; to conduct classification and declassification reviews of documents; and to oversee classification activities in Headquarters, field offices, and contractor organizations.

The key to meeting these goals lies in keeping pace with technological advancements inside and outside the Department. To this end, the Office of Classification has sought, and will continue to seek, support in the development of its classification policies and guidance in the form of technical studies and analyses in such areas as nuclear weapons and safeguards and security. We are using such support in a major revision to the classification guidance covering the safeguards and security program.

During the past year, the Classification program completed a new, comprehensive policy guide for nuclear weapons and is continuing a major revision of its education and appraisal functions with a view towards expanding the scope and improving the effectiveness of these programs. Work is continuing on the development of an automated information retrieval system for all classification guides and other precedent-setting documents. This retrieval system will improve the Department's ability to develop new classification guidance and to provide for a more responsive document review program. Continued support of these and other key projects in Fiscal Year 1985 will ensure that the Department maintains a comprehensive and effective classification program.

PROGRAM DIRECTION

Our program direction request, which is the same as for FY 1984, supports a total of 146 full-time equivalent positions, which includes the staff for the Classification program.

SECURITY INVESTIGATIONS

The Fiscal Year 1985 appropriation request for personnel security investigations is $34.0 million. As you know, Mr. Chairman, background investigations are required by the Atomic Energy Act of 1954, as amended, and by Executive Orders 10450 and 10865. Under these guidelines, the Department is not permitted to conduct background investigations on its own; hence, we have established a single program with procedures wherein the Federal Bureau of Investigation and the Office of Personnel Management conduct these investigations for us on a reimbursable basis. The investigations are conducted prior to the granting of access to Department of Energy classified information, and/or special nuclear materials.

The single program was established in order to have efficient program management and be consistent in meeting the strict security requirements of the Atomic Energy Act of 1954 to ensure that granting access to classified information, classified material, or special nuclear material will not endanger the common defense and security. Most background investigations directly support Defense Programs' activities; however, all Departmental security investigations are funded under Defense Programs since any clearance or access determination is directly related to protecting the common defense and security. We have improved the effectiveness and timeliness of our clearance program by changing procedures in access eligibility regulations revising security questionnaire forms to make them more inclusive, and requiring Department of Energy contractors to perform more stringent pre-employment checks.

The projected cost for a single Federal Bureau of Investigation background investigation is $1,850, which is the same as in Fiscal Year 1984. The projected cost for an Office of Personnel Management background investigation is $1,625, a decrease of about $125 per investigation from Fiscal Year 1984. National Agency Checks are expected to continue to cost approximately $10 each. Our budget request provides for approximately 20,630 full-field investigations and 10,500 National Agency Checks, which is a net increase over the current fiscal year of approximately 3,800 investigations.

SAFEGUARDS AND SECURITY CROSSCUT

To this point I have been discussing the funding request for Security Affairs' programs. The DOE outlay programs provide the funding for the actual construction, capital equipment, and operating expenses for safeguards and security activities relating to their programs at the Department's field facilities. Total safeguards and security funding is reflected in the Department's safeguards and security crosscut, which is an administrative summation of all safeguards and security items in the Department's program requests. The crosscut request for Fiscal Year 1985 totals $565.8 million in budget authority, an increase of $76.9 million over our Fiscal Year 1984 level of $488.9 million including the supplemental.

With respect to these Departmental activities, I have a broad range of responsibilities. A major one of these is the responsibility to carry out a systematic identification of vulnerabilities at our facilities and to ensure that required corrective actions receive prompt attention, emphasis, and support. This responsibility is carried out through normal interface with appropriate Headquarters and field office managers. Unresolved issues are referred through the Assistant Secretary for Defense Programs to the Office of the Secretary.

The Secretary plays a critical role in this process by assuring that activities included in the crosscut receive appropriate support from all levels of management within the Department. This increased emphasis is indicated by the Fiscal Year 1984 supplemental request of $64.3 million, which will provide accelerated funding for safeguards and security activities at the Department's facilities, and by a request for increased funds in the Fiscal Year 1985 crosscut. In particular, we are pursuing a vigorous construction program to upgrade outdated facilities; this is reflected in increased requirements for construction programs in Fiscal Year 1985 and outyears.

VERIFICATION AND CONTROL TECHNOLOGY

The Verification and Control Technology program has four specific goals:

- to develop and produce the technology to monitor foreign nuclear explosions conducted underground, in the atmosphere, and in space and to monitor compliance with nuclear weapons-related treaties.
- to control proposed exports of nuclear- and energy-related materials, equipment, and technology to ensure they are consistent with United States national security and with nonproliferation policy.
- to provide technical and analytical support for the Department of Energy's role in nuclear arms control negotiations, policy formulation, and implementation.
- to meet Department of Energy intelligence requirements and to provide the Department's unique weapons- and nuclear-related expertise to the Director of Central Intelligence and the Intelligence Community.

The Verification and Control Technology program has been managed by the Office of International Security Affairs which, until recently, consisted of three divisions: Science and Technology, Politico-Military Security Affairs, and Intelligence. As I mentioned earlier, we now have a Deputy Assistant Secretary for Intelligence within Defense Programs who will have responsibility for all DOE intelligence activities. Mr. Boykin, a veteran of many years with the Central Intelligence Agency, has also been designated as the Department's Senior Intelligence Officer.

The Fiscal Year 1985 appropriation request for the Verification and Control Technology program is $76.7 million. In addition, there is a $6.2 million Fiscal Year 1984 supplemental request for this program.

The Fiscal Year 1985 increase of $8.8 million over Fiscal Year 1984 is attributable mainly to increased deliveries of nuclear explosion detection sensors which ride on various satellites and lesser increases for our base technology efforts, increased requirements for technical analysis of national security and foreign policy issues related to nuclear weapons systems,

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The Fiscal Year 1985 request also provides $1 million to begin construction of a Space Science Laboratory supporting satellite fabrication and technology development efforts at Los Alamos. Total estimated cost for this facility is $7.5 million, with completion in late 1987.

ACCOMPLISHMENTS

Prior to discussing specific program activities, I would like to briefly highlight several activities and accomplishments of this program.

Over the years, the Department of Energy has delivered state-of-the-art instrumentation for seven United States satellites. These instruments are comprised of sophisticated sensor systems capable of detecting nuclear explosions from the earth's atmosphere DELETED Data transmitted are analyzed and applied to United States responsibilities for the verification of foreign entities' nuclear activities in light of nuclear treaties and in support of United States nonproliferation efforts, DELETED Most of our proposed growth in Fiscal Year 1985 is associated with sensors for the space detection program.

Significant improvements have also been made in developing the ionospheric and infrasonic techniques for monitoring underground explosions and applying these strategies to accurately distinguish between nuclear events and earthquakes. The Coalinga, California, earthquake of May 2, 1983, was detected by both the ionospheric and infrasonic sensors, producing the first earthquake data the Department has acquired under these programs. Efforts are underway to compare and contrast signals detected during this event with past nuclear explosion data to further our overall knowledge and data base in this extremely important area.

Within the Verification and Control Technology program there are two main programmatic elements: detection technology and analytical support.

DETECTION TECHNOLOGY

This element of the program encompasses a wide range of technologies related to the detection of nuclear weapons activities, including spaceborne sensors, debris detection and sample analysis, seismic and nonseismic techniques, and other scientific efforts. The Fiscal Year 1985 budget request for detection technology is $50.8 million, a $5.4 million increase over the Fiscal Year 1984 level of $45.4 million.

SPACEBORNE SENSORS

The overall purpose of our space effort is to develop and maintain U.S. capability to detect, locate, DELETED nuclear explosions from spaceborne platforms

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The effort includes research and development, the actual fabrication of sensor packages, and operational support, which provides for calibration and testing of subsystems and evaluation and analysis of data collection, processing and exploitation. In Fiscal Year 1985, the Department will deliver sensor packages for nine satellites, which amounts to more than a doubling of deliveries over Fiscal Year 1984.

The main carriers of Department of Energy-made sensors are the Global Positioning System

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All Department of Energy sensors ride the satellites on a secondary mission basis. The Global Positioning System's primary mission is to provide a highly accurate navigational capability for the military

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When the Global Positioning System is fully deployed in the late 1980's, the on-board sensors will be able to locate atmospheric nuclear explosions anywhere on earth with a very high degree of precision,

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Base technology activities will include improving sensor longevity and reliability, increasing multi-function integrated circuit capability and substantially reducing size, weight, and power consumption.

DEBRIS DETECTION AND SAMPLE ANALYSIS

By the late 1980s we expect our enhanced satellite sensor capabilities to improve monitoring of the vast ocean areas of the Southern Hemisphere

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In the interim, the Department of Energy is working on design, fabrication, test, and evaluation of a free-floating, buoy-type marine platform and associated sensors with low-cost, real time satellite communication capability to provide partial coverage until full satellite coverage is established. Platforms have been deployed in the Gulf of Mexico and the Pacific Ocean in order to study background radiation, debris transport mechanisms, and radio nuclide deposit patterns. Once the techniques have been demonstrated, we expect that the Air Force Technical Applications Center will pursue final development, procurement and deployment of the marine platforms or of similar special, land-based sensors.

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SEISMIC

The goal of the Department's seismic research program is to determine the effectiveness of regional--that is, short-range--seismic signals for monitoring compliance with nuclear test ban treaties. Such regional seismic monitoring would augment and be integrated with teleseismic--that is, long-range--monitoring systems, currently managed by the Air Force, as a verification tool. The Department's seismic research program is fully coordinated with the Department of Defense, particularly with the Air Force Technical Applications Center and the Defense Advanced Research Projects Agency.

We plan to maintain our seismic detection effort at the Fiscal Year 1984 level, with the Department continuing to operate its five station Regional Seismic Test Network deployed in the United States and Canada. The Regional Seismic Test Network is a research tool for learning how such an in-country system might be used to monitor compliance with nuclear test ban treaties. One objective is to develop technology that will differentiate ambiguous seismic events, such as earthquakes, from nuclear explosions, in order to demonstrate the usefulness of regional seismic measurements for verification. In another effort, by arrangement with Norwegian authorities, the Department of Energy and the Defense Advanced Research Projects Agency this year will deploy and begin operating an experimental Regional Seismic Array System in Norway. Like the Regional Seismic Test Network, one of its objectives will be to reduce ambiguities caused by other seismic events such as earthquakes.

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In Fiscal Year 1985, the array will become fully operational. We expect it to collect data for two to three years. Analysis of this data will determine the value of the technology for verifying compliance with treaties limiting underground nuclear tests.

NONSEISMIC

This program has two main components: infrasonic monitoring, which uses microphone arrays to monitor extremely low frequency sound propagated in the upper atmosphere by underground nuclear explosions; and ionospheric monitoring, which uses over-the-horizon radar to monitor electron-density perturbations of the ionosphere. Both technologies could prove valuable verification techniques because they are long-range monitoring tools which do not have to be deployed within a country's border to determine compliance with nuclear test treaty commitments. Again, a main issue of our research and development effort is developing capabilities to distinguish between infrasonic or ionospheric signals generated by underground nuclear explosions and signals caused by earthquakes, thunderstorms, and such. During Fiscal Year 1985, the nonseismic detection program will continue without major change.

ONSITE MONITORING

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we are examining ways to improve the verifiability of the Threshold Test Ban Treaty. In particular, this budget provides seed money for examining the usefulness of onsite hydrodynamic yield measurement techniques to improve the accuracy of seismic yield estimation.

If and when the Peaceful Nuclear Explosions Treaty is ratified, the United States must be prepared to exercise its onsite monitoring rights. The Fiscal Year 1985 funding request will enable the Department to maintain personnel and equipment in readiness for this activity. However, if the treaty is ratified, additional resources will be needed for the long term.

In Fiscal Year 1985, we intend to pursue enhanced monitoring technology efforts in anticipation that nuclear arms negotiations with the Soviets will be resumed and could lead to agreements requiring new verification measures.

VERIFICATION EXPERIMENTS

In Fiscal Year 1984, working with other U. S. Government agencies, the Department conducted experiments related to remote detection of underground nuclear explosions. The resulting data will be evaluated in Fiscal Year 1985 to improve our means for estimating nuclear yield in support of test ban monitoring and verification.

In Fiscal Year 1985, the Department will undertake experiments using data from our nuclear weapons tests to evaluate monitoring techniques and improve the verifiability of treaties.

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ANALYTICAL SUPPORT

Analytical support activities fulfill our responsibilities in weapons and proliferation DELETED , arms control, export control, technology transfer, and international scientific exchange.

The Fiscal Year 1985 budget request for analytical support activities is $19.7 million, a $1.8 million increase over the Fiscal Year 1984 level of $17.9 million.

WEAPONS DELETED

The Intelligence Community relies on the Department of Energy and the intelligence elements of the Department's nuclear weapons complex for expertise in the analysis of information regarding foreign nuclear weapons.

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PROLIFERATION DELETED

The basic objectives of the proliferation DELETED program reflect the general United States determination to impede the spread of nuclear weapons. The proliferation DELETED effort contributes directly to formulation and implementation of United States nonproliferation policy and is also valuable in negotiating and monitoring international nuclear agreements and proposed nuclear-related exports. Specific activities within the program are initiated and pursued in coordination with the National Intelligence Office for Nuclear Proliferation. DELETED the program relies heavily on its access to the skills and experience of the Department of Energy's nuclear weapons complex.

Two important activities are the management of the Strategic Tracking and Materials Analysis System, which estimates worldwide trends in inventories and flows of plutonium and highly enriched uranium and our proliferation DELETED training courses. The Strategic Tracking and Materials Analysis System effort complements the Nuclear Materials Inventory System operated by Department of Energy's Office of Safeguards and Security in tracking nuclear materials of U.S. origin. The training courses enable DELETED personnel to become familiar with the nuclear fuel cycle, alternative routes to nuclear weapons proliferation, and the current status of nuclear proliferation activities worldwide.

ARMS CONTROL

The direct relationship between the nuclear weapons program and arms control requires Departmental participation in arms control policymaking, negotiation, and implementation. In Fiscal Year 1985, we will participate in the Non-Proliferation Treaty review conferences, the United Nations Conference on Disarmament and negotiations on possible nuclear test limitation agreements. We will continue taking part in several interagency policy committees and in other committees supporting negotiations, and arrange for weapons laboratories' scientists to provide technical representation as necessary. We will continue to provide support to the Conference on Disarmament working groups negotiating a treaty banning radiological weapons and investigating verification and compliance issues associated with a Comprehensive Test Ban Treaty.

The Department will also continue to be represented in major interagency reviews of arms control policy that are relevant to the nuclear weapons program.

EXPORT CONTROL, TECHNOLOGY TRANSFER, AND INTERNATIONAL EXCHANGE

We will continue to review proposed nuclear and energy-related exports, technology transfer, and international cooperation and exchange agreements to ensure their consistency with United States national security and nonproliferation objectives.

Because of the unique experience and resources of the Department of Energy nuclear weapons complex, we will also be called upon to support the Department of Defense in identifying emerging and militarily critical technologies and to support the Departments of State and Commerce in carrying out their responsibilities for controlling United States exports and international cooperation and exchanges; make recommendations to the Nuclear Regulatory Commission regarding exports of nuclear materials, reactors, and equipment specially-designed for nuclear purposes; control Naval and maritime nuclear propulsion technology in coordination with Department of Energy's Office of Naval Reactors.

CAPITAL EQUIPMENT

Capital equipment expenditures support research, development, test, and production activities through the provision of test equipment and instrumentation related to the total program. There is a continuing need to update test equipment at the Sandia National Laboratories, the Lawrence Livermore National Laboratory and the Los Alamos National Laboratory. Most equipment is small-scale bench test equipment such as oscilloscopes, electronic calibration devices, and small-scale electronic support devices. Additionally, specialized equipment is needed in the analysis of weapons, proliferation, and export control issues.

The Fiscal Year 1985 request for capital equipment is $2 million, a slight increase over the 1984 figure of $1.8 million.

CONSTRUCTION

To ensure that we can meet requirements for spaceborne sensors in the late 1980's and beyond, the Department is requesting $1 million to begin building a Space Science Laboratory at Los Alamos. It would be completed by Fiscal Year 1987 at a total estimated cost of $7.5 million.

This facility will enable us to:

- meet delivery commitments for spaceborne sensors;
- improve productivity of sensor fabrication, testing, and post deployment support;
- meet quality assurance and health and safety standards; and
- accommodate a projected increased workload.

Projects planned for this facility pose significant technological challenges to our scientists and engineers, in some case calling for development of virtually new technologies before even prototype sensors can be deployed. Present facilities can barely meet the technical demands of current research and development and fabrication activities, much less the development of new technologies and the stepped-up fabrication and delivery schedule.

In addition to impeding the successful development of new technologies, our present facilities would probably increase the cost of development because the sensors would have to undergo manual testing. Manual testing is not only less likely to meet stringent quality assurance standards, but also is very time consuming and increases the risk of missing a delivery commitment.

Another factor contributing to the need for the new facility is that most satellites on which Departmental sensors will ride will be deployed by the space shuttle. Unlike satellite launches by unmanned rockets, shuttle-deployed satellites must meet more rigorous quality and testing standards to ensure the safety of the shuttle crew.

PROGRAM DIRECTION

Program direction funds provide for the salaries, benefits, and travel expenses for 60 FTE's, the same as the Fiscal Year 1984 request. These employees are responsible for technical and analytical program management of field activities, and execution of Headquarters staff functions.

FY 1984 SUPPLEMENTAL REQUEST

In addition to the Fiscal Year 1985 request, we also have $6.2 million in the Fiscal Year 1984 supplemental request. The additional resources are required to support two high priority activities: the satellite instrumentation program and analytical intelligence. In the satellite instrumentation program, an additional $4.2 million is required to maintain the latest scheduled production of nuclear explosion detection sensors for the Global Positioning System satellites. When the Fiscal Year 1984 budget was originally developed, the Department planned to deliver two Global Positioning System payloads in Fiscal Year 1985. However, as a result of an Air Force decision to procure the Global Positioning System satellites on an assembly line basis, rather than a few satellites at a time as was previously the case, the Department must now deliver five sensor packages in Fiscal Year 1985. The additional $4.2 million will support the advance procurement and fabrication activities which must be conducted this fiscal year in order to meet the revised Fiscal Year 1985 delivery schedule.

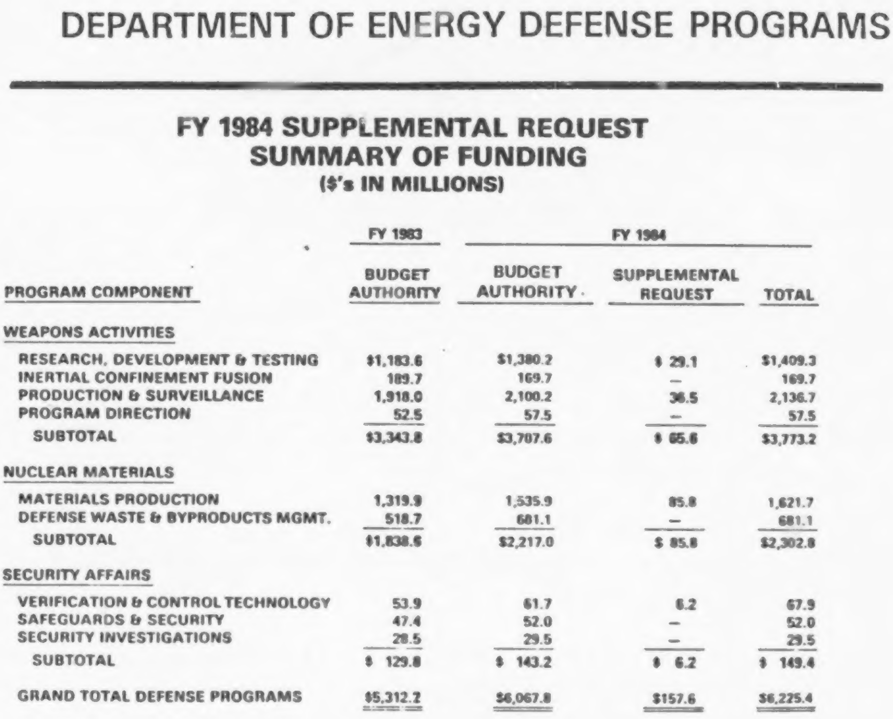
DEFENSE PROGRAMS

DEFENSE PROGRAMS MISSION

- DESIGN, TEST AND MANUFACTURE ALL U.S. NUCLEAR WEAPONS
- DEVELOP INERTIAL FUSION IN SUPPORT OF THE NATION'S MILITARY NEEDS
- PRODUCE ALL NUCLEAR MATERIALS REQUIRED FOR THE U.S. WEAPONS PROGRAM AND MANAGE DEFENSE NUCLEAR WASTE
- ENSURE THE PROTECTION, CONTROL AND ACCOUNTABILITY OF SPECIAL NUCLEAR MATERIALS AND DOE FACILITIES
- ENSURE VERIFICATION OF INTERNATIONAL ARMS AGREEMENTS AND CONTROL THE TRANSFER OF SENSITIVE TECHNOLOGY AND EQUIPMENT
- CONTROL THE DISSEMINATION OF CLASSIFIED INFORMATION

AUTHORITY

- ATOMIC ENERGY ACT OF 1954, AS AMENDED (TRANSFERRED TO DOE BY PL 95-91, "DOE ORGANIZATION ACT").
- ANNUAL "NUCLEAR WEAPON STOCKPILE MEMORANDUM," APPROVED BY THE PRESIDENT, DIRECTS SPECIFIC WEAPON BUILDS AND RETIREMENTS.



DEPARTMENT OF ENERGY DEFENSE PROGRAMS

FY 1984 SUPPLEMENTAL REQUEST
SUMMARY OF FUNDING
($'s IN MILLIONS)

	FY 1983	FY 1984		
PROGRAM COMPONENT	BUDGET AUTHORITY	BUDGET AUTHORITY	SUPPLEMENTAL REQUEST	TOTAL
WEAPONS ACTIVITIES				
RESEARCH, DEVELOPMENT & TESTING	$1,183.6	$1,380.2	$ 29.1	$1,409.3
INERTIAL CONFINEMENT FUSION	189.7	169.7	–	169.7
PRODUCTION & SURVEILLANCE	1,918.0	2,100.2	36.5	2,136.7
PROGRAM DIRECTION	52.5	57.5	–	57.5
SUBTOTAL	$3,343.8	$3,707.6	$ 65.6	$3,773.2
NUCLEAR MATERIALS				
MATERIALS PRODUCTION	1,319.9	1,535.9	85.8	1,621.7
DEFENSE WASTE & BYPRODUCTS MGMT.	518.7	681.1	–	681.1
SUBTOTAL	$1,838.6	$2,217.0	$ 85.8	$2,302.8
SECURITY AFFAIRS				
VERIFICATION & CONTROL TECHNOLOGY	53.9	61.7	6.2	67.9
SAFEGUARDS & SECURITY	47.4	52.0	–	52.0
SECURITY INVESTIGATIONS	28.5	29.5	–	29.5
SUBTOTAL	$ 129.8	$ 143.2	$ 6.2	$ 149.4
GRAND TOTAL DEFENSE PROGRAMS	$5,312.2	$6,067.8	$157.6	$6,225.4

FUNDING SUMMARY

Mr. MORGAN. The first vu-graph is the defense program mission. Clearly, we're responsible for designing, testing, and manufacturing all nuclear weapons and for development of the inertial fusion. We do produce all the nuclear materials required for the nuclear weapons program, and then, of course, this is all protected through the safeguards and security program. We also have the verification and control technology program, and we control the dissemination of classified information through our classification program. Our authority is stated on the next vu-graph. [Chart.] The total that we're requesting in the fiscal year 1984 supplemental request is $157.6 million. [Chart.] That's the supplemental request shown in the next slide.

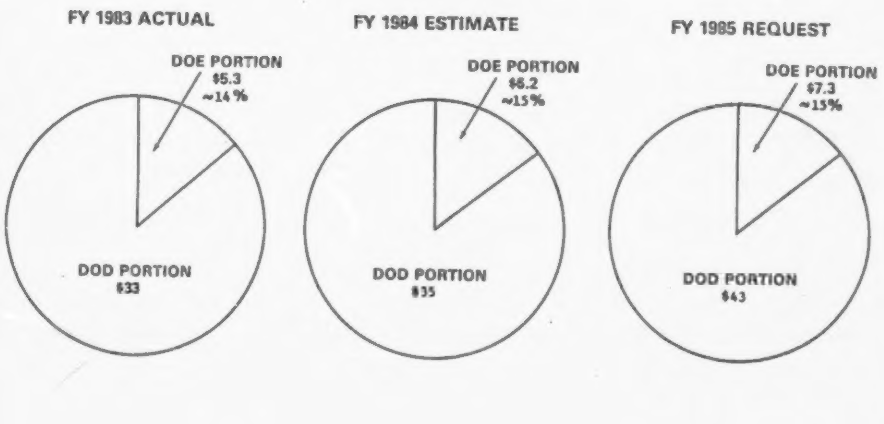
DEFENSE PROGRAMS

DOE — DEFENSE PROGRAMS
FY 1985 BUDGET REQUEST
SUMMARY OF FUNDING
(\$ IN MILLIONS)

PROGRAM COMPONENT	FY 1984 BUDGET AUTHORITY	FY 1985 BUDGET AUTHORITY
WEAPONS ACTIVITIES		
RESEARCH, DEVELOPMENT & TESTING	$1,380.2	$1,723.2
INERTIAL CONFINEMENT FUSION	169.7	138.0
PRODUCTION & SURVEILLANCE	2,100.2	2,621.7
PROGRAM DIRECTION	57.5	60.2
SUBTOTAL	3,707.6	4,543.1
NUCLEAR MATERIALS		
MATERIALS PRODUCTION	1,535.9	1,864.2
DEFENSE WASTE & BYPRODUCTS MGMT.	681.1	752.8
SUBTOTAL	2,217.0	2,617.0
SECURITY AFFAIRS		
VERIFICATION & CONTROL TECHNOLOGY	51.7	76.7
SAFEGUARDS & SECURITY	62.0	62.7
SECURITY INVESTIGATIONS	29.5	34.0
SUBTOTAL	143.2	173.4
PROPOSED FY 1984 SUPPLEMENTAL	157.6	—
GRAND TOTAL DEFENSE PROGRAMS	$6,225.4	$7,333.5[a]

[a] EXCLUDES SAVINGS FROM MANAGEMENT INITIATIVES.

TOTAL NUCLEAR WEAPON SYSTEMS BUDGET — DOD AND DOE
(B/A \$ IN BILLIONS)



Mr. MORGAN. In the fiscal year 1985 budget, we are requesting budget authority of $7.3 billion. The next chart shows the dollar amounts for the total nuclear weapons systems. When comparing the DOD to the DOE portions, you can see where the DOE portion of the budget in each year is approximately 14 to 15 percent of the entire budget for all nuclear weapons systems. I would like to summarize and say that we will talk in detail with you about the increases for the DOE portion at a later point in time, but at this point, I'd like to turn the testimony over to Dr. Wagner, who will cover some current issues and re-address any other issues you may want to discuss.

DOE JURISDICTION OVER ATOMIC ENERGY DEFENSE ACTIVITIES

Senator DOMENICI. Now, DOE has responsibility for these activities under the Atomic Energy Act even though they are defense-related programs—is it working adequately?

Dr. WAGNER. That is a good question, Mr. Chairman, and I would like to take it, for the record, for a more complete response, but let me give you a quick summary. There are some areas in which it's working adequately and other areas in which it is not working adequately, I think. Because of the separation of the cutting edge of the technology, which is research and development on weapons, which is done by DOE, that separation from DOD has resulted over the years in a fragmented and incomplete nuclear weapons infrastructure in the Department of Defense. We depend on the Department of Energy to fill in those gaps in our infrastructure, but I believe that the country has some serious difficulties because of that. There is no question but that DOE supplies superbly designed and manufactured warheads for the country, but there is more to deterrence than just that, and I believe we do suffer to some extent because of the separation of the appropriations.

Senator DOMENICI. Why don't we, rather than do that, let's leave that question as you've stated it, and rather than have you proceed any further on the record, in that I'm really not aware that anybody other than myself is terribly interested at this point—so why don't we do that on our own at some point? Let's get together, and if there are a couple of Senators that are interested, we'll talk about it. It really is not an appropriations issue, but more an authorizing or policy issue.

ROSE GARDEN BUDGET AGREEMENT ON DEFENSE PROGRAMS

In working out budget agreements informally with the President and the Secretary of Defense in these White House conferences, we worked out a number, for starters at least, that the President and Secretary Weinberger would agree to support by way of reduction of the DOD overall budget, and we picked a number that represented this DOE portion of budget function 050. Are you aware of the number?

Dr. WAGNER. I have heard varying reports, actually, on that meeting. I have talked with the people in OMB about it, and their representation of it is that there was indeed a Department of Defense number, which as you know, we are working to figure out how to live within. And, we believe that we should wait until the Department of Defense's programs are adjusted to the new top line and see how that impacts the nuclear parts of the DOD program, and then adjust the DOE requests accordingly. I think that's a process that will take a week or two, perhaps, and it might result in some reductions.

Senator DOMENICI. So, it's not clear that there would be any reductions in the DOE nuclear weapons program?

Dr. WAGNER. If DOD does not respond to the new top line by cutting nuclear warhead—nuclear system programs—then we would not like to see reductions in the DOE program. If we cut some system programs, then we could see reductions in the DOE program. You know, if we cut some system programs, then we have——

Senator DOMENICI. I'm not going to argue with you. I think they've agreed on numbers, but you know, if they're not telling you that, then I'm not going to tell you at this point. Let them do it. It wasn't done very scientifically, I'll tell you that, but nonetheless, it was done.

OK, why don't you proceed.

PREPARED STATEMENT OF RICHARD L. WAGNER

Dr. WAGNER. I would like to also enter, if I may, my full prepared statement.

Senator DOMENICI. Without objection, so ordered.

[The statement follows:]

STATEMENT OF RICHARD L. WAGNER, JR.

Mr. Chairman and members of the committee, it is my pleasure to appear before you again this year to discuss the Department of Defense's nuclear weapons program requirements and long-term objectives. With the support of this committee and the Congress, we have made significant progress in modernizing our nuclear deterrent forces since I appeared before you a year ago. But there is much more remaining to be done. The requirements for modern nuclear systems, both strategic and nonstrategic, have not diminished because the world we live in today is still a dangerous one. Our sincere efforts to reach agreements with the Soviets on arms reductions have not yet been successful, but we are convinced that success in these negotiations depends on Soviet perceptions of our willingness to retain an adequate deterrent balance. Only then will they return to the negotiating table and join with us in seeking real, balanced, and verifiable reductions in nuclear forces.

On this same occasion last year, my statement was directed to three major points:

(1) That the DOD weapon systems, and their associated DOE-produced warheads, are sorely needed;

(2) That advanced warhead development is paying off in improved features for deployed warheads; and

(3) DOE advanced technology, in and of itself, contributes to keeping the Soviets in a deterred frame of mind.

These points are, of course, still valid now, a year later; and for the central theme of my discussion of the DOE weapons program this year I'd like to come at them from some different directions, and add some additional perspective. I'll summarize briefly, and then return to discuss each point in turn. There are four points:

First, the requests by the Department of Defense of the DOE for weapon production are consistent in detail with the system developments requested in the DOD budget. There are no extras. Because of this, the justifications of the warhead developments, in terms of contribution to deterrence, are best discussed in the context of the systems in the DOD budget, and I will only briefly mention those systems here this year. For those systems, in making warhead development and production requests, we in DOD recognize that DOE resources and capacity are quite limited, and we do as much as we can to reduce the production demands. Nevertheless, the demand is substantial, and will stress the DOE capabilities.

Second, the DOE technology base, and in particular the weapon labs' technology base, nourishes the overall national defense infrastructure in many important but often not very visible ways. There is much more to the overall deterrent provided by those weapon systems than just the hardware itself, and the labs make important contributions beyond warhead design. This is true in nonnuclear defense technology as well as in nuclear technology. Because of these broad contributions, it is doubly important that the technology base—facilities, equipment, people, basic research, and exploratory development—be brought up to date and kept there.

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Because of all these factors, cuts in the DOE defense programs budget would hurt badly this year.

Let me now give you some specifics on those four points.

REQUIREMENTS RELATED DIRECTLY TO DOD PROGRAM

Historically, since the early days of the Atomic Energy Commission (AEC), our national policy has been to maintain a separation between the developer/producer of nuclear weapons and the military forces who can be called on to employ them. In the early days this separation was much more distinct than it is today, and included complete AEC custody of all weapons until late in 1956 when the military was made responsible for control of some weapons. In 1959 the DOD was given responsibility for custody of all operationally deployed nuclear weapons, and we retain that responsibility today, though DOD and DOE still work closely on safety and security of weapons from design, through deployment and stockpile improvements, until final retirement.

In the early days, when the technology of nuclear weapon design was developing rapidly, the weapon designer determined to a very great extent the limits of capability that could be provided to the military. By the 1960's, as weapon design technology matured, military requirements had a greater influence on weapon characteristics. For nearly 39 years the military liaison committee has served to coordinate the needs of the military services with the capabilities of the AEC, then ERDA, and now the DOE defense programs. I believe this cooperative process has served the National well and will continue to serve well in the future.

WEAPONS ARE COMPLEMENTARY RESPONSIBILITIES OF DOE & DOD

- DETERMINATION OF MILITARY CHARACTERISTICS IS A PRIMARY FUNCTION OF DOD
- DEVELOPMENT AND PRODUCTION OF NUCLEAR SYSTEMS ARE PRIMARY FUNCTIONS OF DOE:
  - PRODUCING NUCLEAR MATERIALS
  - DEVELOPING, TESTING, PRODUCING, & ASSURING RELIABILITY OF NUCLEAR WEAPONS
- DIVISION OF RESPONSIBILITIES, EXCLUSIVE OF "NUCLEAR" SYSTEMS, IS BY JOINT AGREEMENT
- DOD AND DOE ARE JOINTLY RESPONSIBLE FOR PREPARING THE NUCLEAR WEAPONS STOCKPILE MEMORANDUM FOR PRESIDENTIAL APPROVAL
- BOTH DOD AND DOE ARE RESPONSIBLE FOR FOSTERING THE TECHNOLOGY BASE:
  - CONDUCTING RESEARCH
  - INVESTIGATING NEW AND INNOVATIVE CONCEPTS
- DOD AND DOE SHARE THE RESPONSIBILITY TO:
  - IDENTIFY AND RESOLVE HEALTH AND SAFETY PROBLEMS CONNECTED WITH NUCLEAR WEAPONS
  - PREVENT UNAUTHORIZED USE OF NUCLEAR WEAPONS
  - COORDINATE EFFORTS TO IMPROVE THE EFFECTIVENESS OF PHYSICAL SECURITY MEASURES

As shown on this chart, the DOD and the DOE have complementing responsibilities for development and production of nuclear weapons. In January 1983 we updated our working arrangements by formalizing a new memorandum of understanding, and we have been active over the past year in updating the detailed processes by which we jointly manage and conduct the research, development, testing, production, and other aspects of these complex programs. We have also recently established new agreements between DOD, DOE, and Justice on the response to terrorist threats, and also between DOD, DOE, and NASA on developing nucler power for use in space.

We have also worked together to make better use of our limited resources by expanding our joint efforts in nonnuclear and nonweapons areas where the unique capabilities of the national laboratories can contribute more fully to the Nation's defense needs. In the future we believe there will be greater opportunities for more joint programs, especially in areas where technologies are similar.

How then are these deterrent requirements connected to activities in the Department of Energy for warhead development, production, and maintenance? And how can we judge the research and development activity that is needed?

The process begins by the operational commanders assessing their needs to conduct the operations assigned them with reasonable assurance and minimal risk. These operationally required forces are then evaluated in light of fiscal and policy guidance issued by the Secretary of Defense. The results of this evaluation are reported by the JCS in their joint program assessment memorandum. The forces needed are included in the DOD 5-year defense plan (FYDP), and the programs and funding are thoroughly reviewed during the DOD budget hearings in the Congress.

Within DOD, the nuclear weapons required to support approved FYDP forces are then calculated and reflected in the nuclear weapons stockpile memorandum (NWSM) which is developed jointly with DOE and submitted to the President for approval. The production requirements placed upon the DOE represent nuclear weapons which are required to support approved weapons systems which the services are in the process of procuring. Although there are some changes in our projections for specific systems from year to year as we refine our estimates of future needs and react to fact-of-life changes in direction, the aggregrate projections over the past several years have been very accurate. Over the FYDP period especially, DOE has a solid basis for planning, and the out-years are now more realistic than ever.

The specific DOD programs which form the basis of our requests of DOE are, of course, the result of the interaction between the Department of Defense and the Congress which results in authorized and funded DOD programs. Specific justification of these programs is most properly discussed in connection with the DOD budget. Let me briefly summarize them here.

Over the past 3 years the Congress has approved the major elements of the President's program to modernize all three legs of the strategic nuclear triad, and to improve our nonstrategic nuclear deterrent. The Department of Energy has engaged in a truly cooperative spirit with the DOD to acquire and field these systems and the warheads that arm them. As you know, the ALCM is being deployed with our B-52 forces; the B-1B will be fully capable of carrying our newest weapons which will give added strength and flexibility to our bomber force; the Peacekeeper with its new warhead will begin deployment in late 1986; and the new Trident II SLBM with a new warhead is under development. We have begun deployment of GLCM and Pershing II as agreed with our NATO allies. The new 8-inch W79 AFAP is being produced and stored in the United States. We are confident that it can be deployed to support theater forces if needed. Any future deployments will occur only after consultation with the allied nations involved. These new systems increase the credibility and capability of our deterrent posture—and all of these systems depend on the warheads produced by DOE.

Last year the Congress directed that we terminate the W82 155mm development program. We are now engaged in activity which is consistent with that guidance. Indeed, you will find no DOE request for W82 funds in the fiscal year 1985 budget. On the DOD side, we have asked for a modest amount to allow completion of a limited technical data package. This will enable us to reach a logical termination point that provides for an orderly consolidation of the considerable technological advances made thus far. Moreover, because of the deficiencies in NATO's TNF and the urgent need for modernization, we intend to ask you to reconsider the production issue in the context of the report on NATO's TNF which was required in the fiscal year 1984 Authorization Act. That report is being prepared now and will be provided to you soon. We believe the W82 is needed as a deterrent to the large Soviet capability we face. In order to understand this, I will describe briefly how short-range nuclear systems contribute to deterrence.

Short-range nuclear weapons serve two major kinds of deterrence functions:

One is a broad, theoretical, and political one, where the short-range weapons are part of a continuum of capabilities that contribute to escalation control, linkage to the strategic deterrent, and a general sense of strength that enhances resolve. Short-range weapons have advantages and liabilities in this context—advantages in filling what could otherwise be a functional gap in the deterrence continuum (especially in light of an ongoing Soviet buildup of battlefield nuclear weapons), and political liabilities in NATO in that they bring to mind warfighting.

The other deterrence function short-range nuclear weapons perform is to deter by influencing the Soviets' estimate of the outcome of the actual battle. This role should be taken very seriously, because the Soviets may well weigh all the sophisticated factors making up deterrence theory.

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Nuclear artillery is particularly hard for them to destroy for several reasons. Artillery is dual capable, which means the nuclear is virtually indistinguishable from the conventional capability. We have thousands of cannons, the cannons are widely dispersed and camouflaged, and are very mobile. The 155mm shell is especially important because most of NATO's cannons are of that size. [Deleted.]

We also know, even if battlefield weapons are not used, the threat of their use forces the Soviets to fight in a "nuclear scared" or dispersed posture, which makes their conventional operations less effective. This dispersal is one aspect of their echelonment posture. In the absence of short-range weapons, it would be easier for them to mass forces forward for breakthrough. Thus, the presence of battlefield nuclear weapons goes hand-in-hand with our developing posture of deep attacks against echeloned forces.

Beyond these arguments about their survivability and forcing dispersal on the Soviets, there is a high probability that actual use of nuclear weapons on the battlefield would simply bring everything to a halt. There would be fires, tree blowdown, fallout, contaminated equipment and areas, psychological and other effects that can't be quantified or analyzed. The Soviets appear to know this, and spend effort to try to counter it. But one must suspect that the last thing they want is to see the attack just stop.

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The total systems cost of nuclear artillery is low compared to other nuclear weapons systems, because the cannons and personnel already exist. All that is needed are the shells.

Because of its greatly improved military effectiveness, the W82 will significantly enhance our theater deterrence by substantially reducing the Soviet's estimate of success in a major ground offensive.

We are improving our deterrence posture with deployment of the GLCM and the Pershing II, and the new W79 does add some capability, but we believe the W82 is needed also.

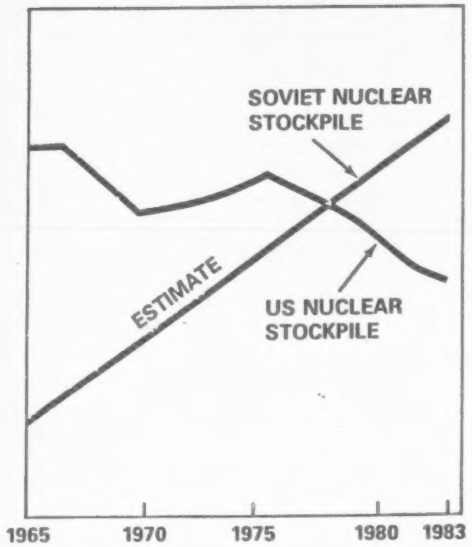
As we field the modern theater and strategic systems, simultaneously the DOE is working along with DOD to retire our older weapons from the stockpile. This allows us to recover and reuse valuable nuclear materials and reduces the stockpiling of obsolete weapons, but it imposes an additional workload on the production complex that must be considered. The retirement of an old weapon involves nearly as much work as building a new one. Additionally, we are modifying selected weapons now in the stockpile to extend their utility and to add improved safety and security features. This reduces the need to build new weapons and saves resources, but it does impose some added workload on DOE.

Unfortunately, but necessarily, support of the expanded production workload has not allowed the needed facilities improvements and expansion of R&D efforts to proceed as rapidly as we would like. Maintaining a healthy infrastructure will be vital to our continued success in the years ahead.

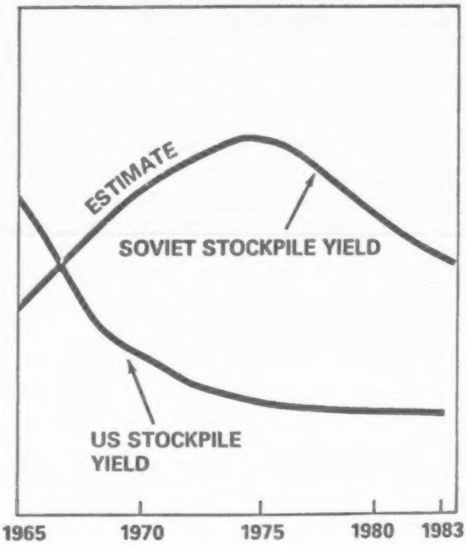
Our longer range planning is obviously less exact; the estimated requirements are based upon the services' extended planning annex, joint staff inputs, and weapon systems concepts currently in research and development. In addition, we take into account leadtimes needed for facilities, plant equipment, R&D, and testing within DOE to avoid prematurely foreclosing a capability which requires long leadtime. In our long-range requirements we consider possible arms control agrements, but we also develop planning which preserves this Nation's capability so that we are not dependent on achieving any specific agreement.

Much has been made recently of the size of the U.S. weapon stockpile, which has been declining both in yield and number.

US AND USSR NUCLEAR STOCKPILES



US AND USSR STOCKPILE YIELDS



[Deleted] as shown in this chart. Despite this, we do not attempt to match our estimates of the Soviet nuclear weapons stockpile weapon for weapon or system by system. Instead, we consider the deterrent capability needed, the contribution of our nuclear weapons systems in providing both strategic and nonstrategic deterrence, and the deployment necessary to support our military forces with the necessary flexibility.

Let me put our requests for substantial weapon production during the next few years into perspective in light of the President's desires for, and work toward, arms reductions. It is certainly true that if the Soviets agree to deep cuts, some systems would be curtailed, with corresponding reduction in warhead builds. However, set against this are two other factors. First, in a number of cases the reductions would come from old systems, with production still needed for the new ones, since what we are about is a modernization because of the age of our weapons. (And remember that accelerated retirements also pose a substantial workload on DOE.) Second, planning for the levels of production that we are forecasting constitutes, in reality, a hedge against delays or failure in the Soviets' agreeing to reductions. Indeed, we would not want to hold out the prospect to the Soviets that, by simply waiting us out, they could achieve one-sided reductions in the United States because we had prematurely reduced our future planning levels. In terms of number of warheads, the threat is not so much the current imbalance, as it is the Soviet capacity to build many more warheads, continuing at their recent high rate. They clearly have this capacity, as evidenced by the rapid buildup in the last decade. They have no incentives to discontinue use of this capacity, which they have already bought and paid for, unless we can show the capacity to match them if need be. This is why planning for increases is so important—not because we want them, but to give the Soviets incentive to stop their buildup.

To improve our longer range planning, we have increased the interaction between the DOD and DOE during formulation of the nuclear weapon development guidance (NWDG). The NWDG is the long-range planning document that presents DOD-wide nuclear weapon development requirements and technology goals to the DOE. The document formulation process was revised in May 1982 to encourage greater user/developer interaction. A major element in the NWDG process is the use of technical assistance teams composed of DOD, DOE, and Defense Nuclear Agency (DNA) research personnel participating in workshops and discussions with nuclear capable unified and specified commands and other selected service activities. For the fiscal year 1983 NWDG 11 workshops were held. The technology objectives identified in the fiscal year NWDG (see charts) center on [deleted].

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[Deleted] the new NWDG formulation process will be conducted on a biennial basis in the future. Our intent is to improve the marriage between the technology "push" and the "pull" from military requirements.

Another example of increased cooperation between the DOD and DOE, as it relates to the stockpile and its future, is in the area of stockpile confidence tests. As the name suggests these are underground nuclear tests that complement our quality assurance program in confirming the reliability of our nuclear stockpile. An interagency planning committee works jointly to identify candidate warheads. The chart shows the stockpile confidence tests since 1970.

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Planning for each annual nuclear test program is coordinated jointly.

[Deleted.] Additionally, we are now working much more actively to take advantage of operational test and evaluation activities by adding research and reliability experiments where this can be done with minimum interference. The DOD and DOE also jointly develop plans for postdevelopment nonnuclear testing of nuclear weapon subsystems. The plans describe the testing that provides an objective basis for assessing nuclear weapon subsystem reliability throughout the postdevelopment life cycle. These plans are an important management tool because they provide a clear understanding of the separate and joint responsibilities for test, evaluation, and reporting for each weapon program, while avoiding unwarranted duplications in the test program.

In planning for the future the military services are now much more aware of the limited, finite resources available within DOE defense programs. As a result, the Military Liaison Committee (MLC) pays a lot of attention to ensuring that the weapon and related requirements which we transmit to DOE are realistic, necessary, and devoid of "gold plating." As a matter of course, all resource-related requirements for the DOE must be forwarded through the MLC. We give each careful attention to reduce the impact on DOE programs. Specific areas which are considered include: [Deleted.] Some of the ways we have scrutinized requirements are shown in the chart, and described in the following:

As an example of the detail in which we review nuclear weapon requirements, let me review for you our considerations related to intrinsic radiation requirements, which can have a substantial impact on both DOD nuclear weapon operations and DOE weapon design. In July 1980, the Military Liaison Committee was tasked to act as a committee on nuclear weapon intrinsic radiation (INRAD), to explore current work in this area, look for neglected areas of importance, and recommend any actions needed to assure a safe, well-documented approach to nuclear weapon operations with respect to intrinsic radiation in the future. A working group comprised of representatives from OSD, DNA, the services, the joint staff, and DOE participated in the study.

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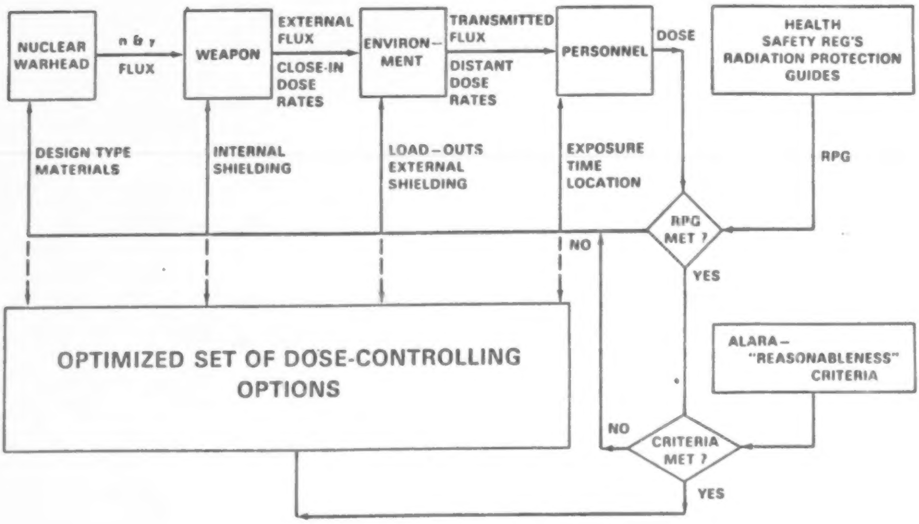
The recommendations, approved by the MLC last year, primarily involved: Implementation of a recently issued DOD instruction, "Occupational Radiation Protection Program"; incorporation of a total systems approach in the determination of INRAD military characteristics at the outset of the nuclear weapon system design process; and establishment of a follow-on group to maintain continuing attention in this area.

We have established a total system approach in determining INRAD military characteristics, because this requirement can substantially impact the warhead design, including the need for additional underground nuclear tests, and add complexities (and therefore additional costs) to subsequent production. This is an excellent example of actions we in the DOD are taking to conserve scarce DOE resources. Each project officer's group forms a subcommittee, with both service and DOE representatives, to investigate, evaluate, and resolve INRAD issues for military characteristics.

INTRINSIC RADIATION TRADE-OFF MODEL


NUCLEAR WARHEAD
n & γ
FLUX
WEAPON
EXTERNAL FLUX
CLOSE-IN DOSE RATES
ENVIRON-MENT
TRANSMITTED FLUX
DISTANT DOSE RATES
PERSONNEL
DOSE
HEALTH SAFETY REG'S RADIATION PROTECTION GUIDES
DESIGN TYPE MATERIALS
INTERNAL SHIELDING
LOAD-OUTS EXTERNAL SHIELDING
EXPOSURE TIME LOCATION
RPG
RPG MET ?
NO
YES
OPTIMIZED SET OF DOSE-CONTROLLING OPTIONS
ALARA- "REASONABLENESS" CRITERIA
NO
CRITERIA MET ?
YES

As shown in the chart, the INRAD exposure to personnel is estimated by considering their location and exposure times, and by considering shielding naturally provided by the weapon system and environment. Many options exist to reduce the already quite low exposures. Warhead design might be modified to reduce INRAD, but shielding both within the weapons system and in the environment, such as aboard ships, might be added. Administrative controls might also be implemented to minimize the presence of personnel in specified areas. Cost and effectiveness of all such options are considered during the development of new warheads.

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These examples illustrate the partnership necessary in the joint DOD/DOE nuclear weapons program to meet the substantial requirements that now exist. On our side we have increased our sensitivity to the impacts of our requirements on the DOE, and the DOE continues to advise us of those impacts. Certainly we can and will do even more to reduce the stresses on DOE of keeping options open over extended periods. The success of the nuclear weapons program has been, and will continue to be, dependent on cooperation by both partners in these areas of joint responsibility.

The fiscal year 1984–89 nuclear weapon stockpile memorandum has been approved by the President.

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The DOD requirements for nuclear weapons from the DOE, in [deleted] aggregate, represent an ordered, well-reasoned modernization of our nuclear forces and are by no means unprecedented in terms of stockpile size, production rates, or retirement rates (see charts).

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Planning for, and providing the materials to meet, our nuclear weapons needs is a complex process. [Deleted.]

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DOE AS PART OF THE OVERALL NATIONAL DEFENSE TECHNOLOGY BASE

The technology base resident in the DOE laboratories contributes to our national defense in many ways besides nuclear weapon design and support for warhead production. The Department of Energy laboratories are a unique source and pool of the Nation's technical expertise, which supports the overall national defense infrastructure in important but often not very visible ways. They have the world's most sophisticated computers and a tremendous pool of highly trained and motivated people. This national resource should be used in the broadest ways we can manage, not exclusively nuclear oriented. Closer interactions with the DOD can draw the theoretical knowledge from the laboratories to many practical applications. Expansion into nonnuclear ordnance and energy related projects are examples. Expansion of formal and informal interchanges are being encouraged to make fullest use of our joint resources.

There's more to nuclear deterrence than just having the weapons, especially when both sides have about the same numbers. The Soviets think about nuclear weapons in terms of warfighting—how the weapons would actually be used—and to deter them we must demonstrate competence in military use—effective targeting and operations with nuclear weapons, safety, security, survivability, weapons effects, long-term endurance. All these are needed to demonstrate that we could actually use the weapons if we had to, and are thus required for a robust deterrent posture. Much of it comes down to having people in the military who are trained and competent in these areas.

The Atomic Energy Act, by removing from DOD the responsibility for warhead design and production, has removed from DOD one of the focal points around which what I might call "broad deterrent competence" might be built. This was perhaps intended by the framers of the Atomic Energy Act, though I believe more important to them was denying custody of nuclear weapons to the military—a circumstance long since changed. (It is somewhat ironic that the situation in the Soviet Union appears to be reversed).

Make no mistake—the DOD, from top to bottom, takes nuclear weapons and deterrence seriously, and there are very competent people involved. But we are handicapped by this separation from the research on weapons in fully building the requisite infrastructure. The Defense Nuclear Agency fills the gap to some extent, but much of DNA's base was created out of the AEC labs and continues to be nourished by them.

My point is that DOE is required to help compensate for this truncation of DOD's nuclear infrastructure, and that this is an important, though not very visible, contribution. Let me give you some examples (see chart):

DOE TECHNOLOGY BASE CONTRIBUTES TO THE BROADER "NUCLEAR DETERRENCE INFRASTRUCTURE"

- NUCLEAR WEAPONS EFFECTS AND SURVIVABILITY
- NUCLEAR WEAPON SYSTEM DESIGN
- ANTI-TERRORIST SECURITY
- REACTORS FOR SPACE AND MILITARY BASE POWER

[DELETED]

- NUCLEAR INTELLIGENCE

1. Weapons effects—understanding them is extremely important for designing systems, ensuring survivability. The Nation is handicapped by the requirement to test underground, so those tests must be very elaborate, environments must be simulated by specially designed nuclear devices, and much must be done with elaborate calculations. A little over a decade ago, the AEC labs had several hundred people doing this kind of work, and most of the difficult problems in weapons effects were identified by the AEC labs. These people provided a base from which the DOD competence in this area was nourished, often by good people leaving the labs and going to work for the DOD contractor community. Today this base at the labs is only about a tenth of what it was a decade or so ago. Much of the slack has been picked up by DNA and the service labs, but what remains in DOE is extremely important. One example is the use, by DNA, of the Los Alamos computation base for DNA calculations.

2. Nuclear weapon systems design, as distinct from warhead design, and especially determination of warhead requirements and how the warhead interacts with the system. Of course much of this is done by the DOD, but the labs play an important role. Recent examples are the labs' contributions to MX basing considerations, modernization of fleet weapons, and simulations of theater weapons operations and engagements.

3. Nuclear weapon security. DOD is responsible for this area, and a fully fleshed-out operational system exists. But in the aftermath of the Munich Olympics and during the rise of international terrorism, when it was clear that we needed to improve our security posture, Sandia in particular took the initiative in identifying useful improvements. They continue to help us in many essential ways, and are a continuing and vital presence on the ground in the European theater especially.

4. Military applications of nuclear reactor systems. The nuclear navy has, of course, maintained the highest standards of competence. But those reactor applications have become quite narrowly applied to ship propulsion needs. The civil nuclear community, quite frankly, appears to lack the vitality to explore innovative military reactor applications. These applications may be very important in two areas—space nuclear power and secure, enduring power for military bases. The labs have maintained an interest in these areas which DOD is now beginning to draw on after decades of little effort.

There are many other examples of how the labs nourish, support, and constructively criticize the DOD nuclear weapons infrastructure.

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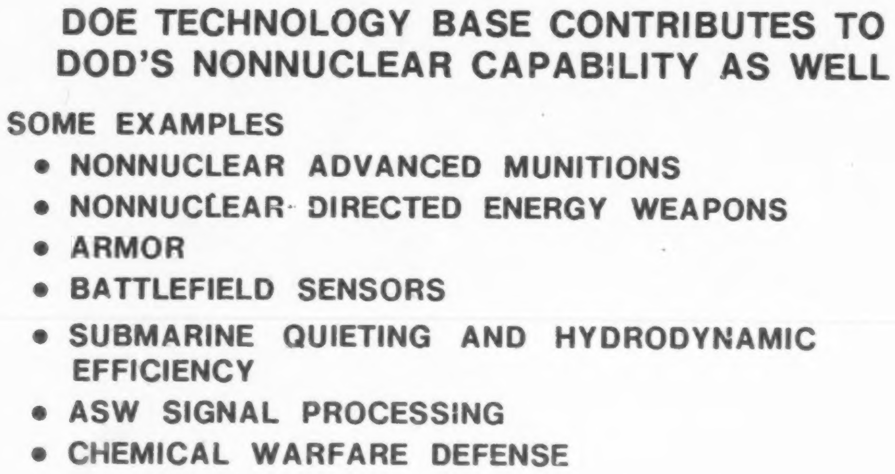
What I have been talking about so far is the way in which the DOE technology base contributes to the larger national nuclear deterrence infrastructure. But the labs' technology base, maintained for nuclear weapon R&D, also contributes importantly and increasingly to the nonnuclear defense posture of the Nation.



DOE TECHNOLOGY BASE CONTRIBUTES TO DOD'S NONNUCLEAR CAPABILITY AS WELL

SOME EXAMPLES

- NONNUCLEAR ADVANCED MUNITIONS
- NONNUCLEAR DIRECTED ENERGY WEAPONS
- ARMOR
- BATTLEFIELD SENSORS
- SUBMARINE QUIETING AND HYDRODYNAMIC EFFICIENCY
- ASW SIGNAL PROCESSING
- CHEMICAL WARFARE DEFENSE

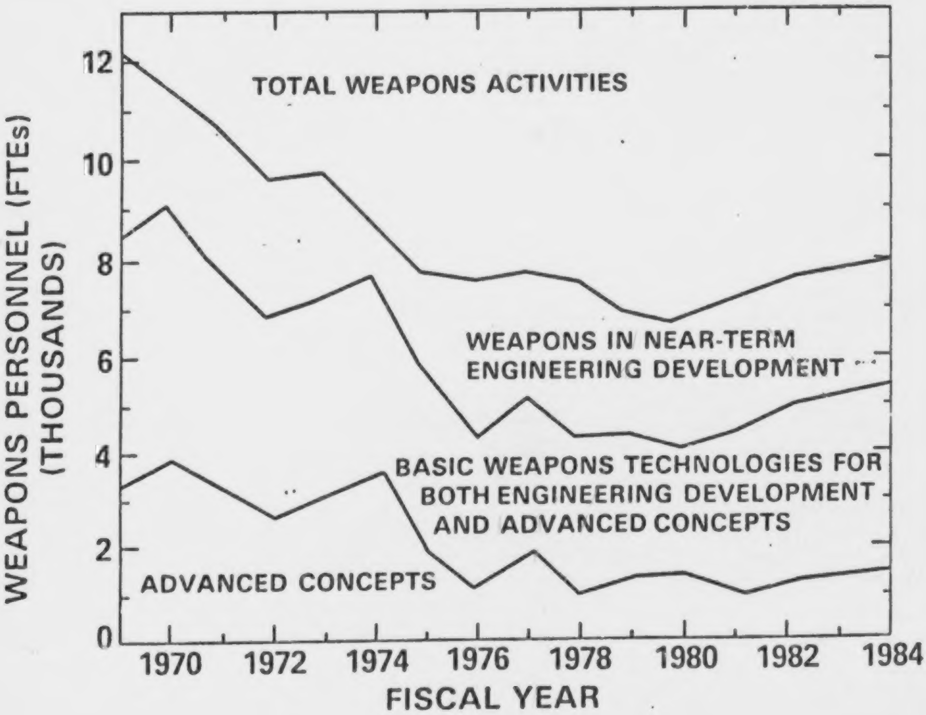
This viewgraph gives examples of this kind of work. Let me talk a little more about one area—nonnuclear munitions.

Of course this nonnuclear work is done on a reimbursable basis, with funding provided by DOD, but the basic capability is there because of the facilities and skills maintained by the nuclear weapon and other DOE-supported programs. If this base declines, or fails to be modernized, the nonnuclear defense posture of the Nation will also eventually be the poorer for it. This chart shows one aspect of the status of that base—that is, the people involved in building and maintaining it.

Finally, let me observe that one very important product of the DOE tech base is experienced, quality people, trained at the DOE weapons labs, who have left the labs to take positions of responsibility in DOD and other parts of the defense community. This contribution ranges from the very high levels—including one Secretary of Defense, three Secretaries of the Air Force, four directors of defense research and engineering, at least one service chief of staff, and several people at the assistant secretary or equivalent levels in defense—to further down in the DOD infrastructure where people such as the hundreds of officers who have served at the labs as military research associates bring their experience to bear in creating a more effective nuclear deterrent posture. This is just one more extremely valuable product of the laboratories' technology base, and one which will also decline if the labs' tech base declines, since the quality of the facilities and equipment, in the long run, is what attracts good people to the program.

It is hard to quantify these kinds of contributions to defense. A guess on my part is that some 15 percent to 20 percent of the labs effort goes to these areas, which are less obvious than the actual warheads designed for production, but are also very important.

R&D ACTIVITY



As you know, and as this chart (R&D Manpower) shows, the tech base effort declined during the 1970's, and we are still, to a greater extent than is prudent, living off technological capital built up before that decline. The following discusses these items in more detail.

This Nation's ability to influence world affairs is affected by the extent to which the United States maintains technological supremacy in the defense area. As you are aware, the national laboratories have assembled a massive and broad technological base in pursuit of their nuclear weapons R&D mission and much of this base is broadly applicable to nonnuclear military technology. These laboratories with their immense technical and computational capabilities represent a national resource that should not be limited to nuclear weapons programs. Just as these laboratories were created to develop a radically different weapon based on new science and new technology, they should now be tasked to pursue advanced weapon concepts of all types applicable to our projected critical miltary needs. The resources and people to support these R&D programs has improved slightly, but we believe much more needs to be done.

Level of effort funding, which has worked so well for nuclear R&D, is essential so that an efficient and stable research base can be maintained and the workload perturbations and uncertainties of contractual arrangements can be avoided. We are working with DOE to encourage some of the world's foremost scientists at the labs by providing broader opportunity to explore long-term research for new technologies with a wide variety of applications. As a first step toward this end, in the area of nonnuclear munitions, the DOD has set aside $10 million in fiscal year 1985 for research on nonnuclear munitions technology, and we anticipate that the DOE will request similar funding for this activity in future budgets. Our interest in expanding the R&D areas of the national laboratories in no way modifies their national security mission of nuclear weapons R&D. It will take greater advantage of their existing capabilities. The skills and knowledge acquired through research on nuclear weapons can be exploited to advance the technology of nonnuclear alternatives, and we are asking that Cogress work with us to accomplish this goal.

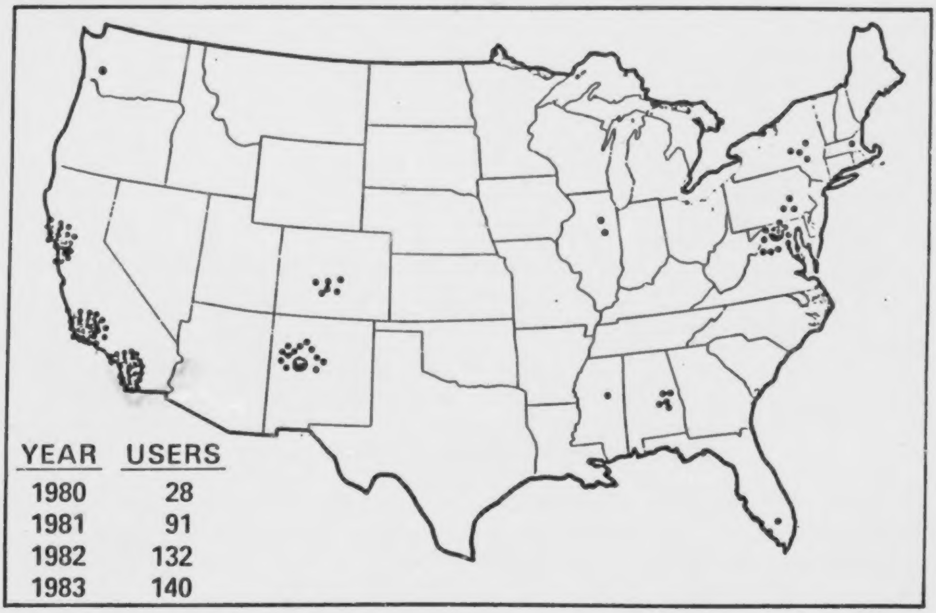
Of foremost importance among the various elements of our nuclear cooperation with our allies is the subject of safety and security of nuclear weapons [deleted].

[Deleted.]

There are many other areas of interaction. For example, analyses by the laboratories of weapon output and effects provided the foundation for systems vulnerability and survivability work now conducted by the Defense Nuclear Agency. Recently, the DOE labs have conducted special analytical studies that assisted DOD in system definition and other major decisions on the SM–2(N), battlefield weapons, and MX basing options. The expertise at the labs is used in many other ways, including nuclear intelligence assessment.

Over the years, DOE has provided people of broad experience and unique technical background to fill technical and management positions in the DOD, other Government, and defense contractor areas. In a somewhat narrower source, personnel exchanges are an excellent way to bridge the technical expert-user gap. These exchanges should be formalized and more effectively used by both DOE and DOD, and we are working hard on improving these personnel exchanges. We have found over the years that the military officers who spend a tour at the laboratories find the experience they gain to be very beneficial later in other assignments. Similarly, the three DOE personnel on my staff, one at DNA, and others, find the experience very beneficial.

In the fall of 1982, DNA and DOE entered into an agreement whereby Los Alamos National Laboratory (LANL) provides computational resources to the roughly 140 contractor organization located throughout the country supporting the DNA RDT&E mission (see chart).



YEAR	USERS
1980	28
1981	91
1982	132
1983	140

This support began in January last year, and is working very well. Access to computer resources at the LANL Central Computing Facility (CCF) are provided through an existing telecommunications network managed by DNA. This computational support included making available half of a cray, an archival file system, and extensive printer and graphics resources. LANL also agreed to integrate DNA's Cyber 176 computer into their facility and manage its operations. LANL assumes the technical and operational responsibility for CCF resources made available to the DNA research community and provides technical planning and diagnostic support for the DNA communications network. DNA retains responsibility for identifying, specifying, and analyzing requirements and then manages the computational resources in accordance with agency priorities.

This arrangement between DNA and DOE has given the DNA scientific community access to superb computational facilities—second to none in the world—and it has done so at substantially lower cost than would otherwise have been possible.

Other areas of mutual cooperation and teamwork between DOD and DOE are too numerous to discuss in any great detail, but these include our joint efforts to protect classified information, to control the export of our defense-related high technology, to assist with nonproliferation activities, to verify compliance (or noncompliance) with existing treaties, and to assist in formulating U.S. positions in the arms reduction negotiations.

ADVANCED TECHNOLOGY AND SOVIET CAPABILITY

Since the early days of World War II, the work of the nuclear weapons program has been driven, in large degree, by uncertainties in what adversaries could do. The Manhattan Project was undertaken partly out of concern for German progress in nuclear physics. In the years after 1945, the hydrogen bomb decision was influenced by estimates of Soviet progress, or lack of it, toward that capability. We are, today, in the middle of the same kind of situation.

As you may know, the DOD has published and distributed two versions of "Soviet Military Power," which was first published in 1981 and updated in 1983, to provide the public with information about the scope and nature of the Soviet threat that we confront. The Armed Services Committee has also been provided a comprehensive briefing on the continuing growth of Soviet military capabilities.

Of all the threats to our ability to encourage a peaceful world, none surpasses that posed by the Soviet nuclear arsenal. Since the first Soviet nuclear explosion on August 19, 1949, that threat has continued to grow larger with each passing year. Its growth pattern has been constant and unaffected by Soviet economic difficulties, our effort toward rapprochement, successes or failures in the arms control arena, or even international crises. The growth seems to move with a vitality and life of its own (see chart).

[Deleted.]

[Deleted.]

[Deleted.]

[Deleted.]

[Deleted.]

[Deleted.]

As you know, President Reagan has directed that a comprehensive and intensive effort be initiated "to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles."

[Deleted.]

The SDI is a research program designed to provide options in the strategic defense arena. In recognition of the importance of the SDI, it will be centrally managed within DOD, with direct responsibility to the Secretary of Defense. Although funded separately, we believe the Department of Energy program is integral to the overall SDI program [deleted].

[Deleted] a memorandum of understanding, signed by the Secretaries of Defense and Energy, to establish the relationship between the overall DOD strategic defense initiative management responsibilities and the SDI research and technology development activities executed by the Department of Energy is in preparation.

[Deleted.]

[Deleted.]

[Deleted.]

[Deleted.]

RESOURCE LEVERAGE IN DOE NUCLEAR WEAPON PROGRAM

[Deleted] also, although the great majority of the cost of a weapons system is borne by the DOD (see chart), the support provided by the DOE is essential. Seemingly small decrements in the DOE budget [deleted] can have significant impact on the more costly DOD programs. Let me give some examples, first in the area of weapon production. Funding for direct warhead production has high leverage. Because of the stringent requirements for safety and reliability, there is inherently a large buy-in price in production. Once this buy-in price is payed, actual direct weapon production is not as expensive as it might appear on the surface. By the same token, small reductions in funding for production can result in disproportionately large reductions in weapons produced. [Deleted.]

[Deleted.]

[Deleted] while it is harder to quantify, this same kind of leverage clearly operates in the area of research and development "product.")

Congressional funding constraints such as those imposed on the Peacekeeper W87 warhead funding have greatly complicated our planning for warhead production, particularly in view of the simultaneous modernization requirements for our strategic and theater nuclear forces. Construction funds in both fiscal years 1983 and 1984 were fenced. The lack of timely release of funds causes a progressively riskier position in trying to meet IOC commitments, to have warheads available when the missile is ready for deployment. Other defense nuclear programs can suffer as an unavoidable result. Because of the nature of nuclear weapon production, construction funds are necessary very early for DOE to support DOD requirements. When the Congress reduces DOE production funding and applies restrictive language on construction funds, this can constrain or delay DOD systems which have already been approved and funded. The result is reduced efficiency in the acquisition process and increased costs in both Departments.

[Deleted] in many such cases, small dollar investments can provide high dividends, not only in terms of DOD programs but the total cost of DOE programs. In simple terms, we must patch the chuck-holes in the road and fix the water pipes or the structure will not continue indefinitely carrying the load we now require.

[Deleted.]

[Deleted.]

[Deleted] SIS can play a significant role in the future production of SNM. [Deleted.]

[Deleted.]

[Deleted.]

[Deleted.]

SUMMARY

By way of summary, I would like to try to place the challenge before us today in context with similar decisions that the Nation's leadership faced in the past. Faced with the stresses of a world war, President Roosevelt reacted promptly and with high priority to Einstein's letter suggesting that development of an atomic bomb should be possible. We have all heard stories about the difficulties and successes of the Manhattan District Project conducted by General Groves and of the driving genius and philosophical stresses of the scientists who designed and built the first crude bombs. We know also that the German nuclear scientists were not far behind us in this research.

Ultimately, President Truman made the hard decision necessary to save many thousands of American lives which otherwise would have been lost in a protracted invasion of Japan. But perhaps the most lasting benefit to the world of President Truman's decision is the impression it has left with all of us that a nuclear war cannot be won and must never be fought.

President Reagan has stated this often, and I am sure we all strongly support this view. How then did we arrive at a condition where we must have nuclear weapons to deter their use? In a more perfect world we would eliminate all these weapons immediately.

After World War II, when the United States had the only existing atomic weapons, to preclude development by other nations we were prepared to place these weapons under the control of a world body. The Soviets effectively prevented this arrangement from succeeding, and we have had to manage in a world of confrontation ever since. We proceeded in stages from an overwhelming nuclear advantage, which allowed us to maintain a strategic deterrent posture characterized as "massive retaliation," to a period of approximate equivalence of strategic forces—but there is continuing Soviet growth. Today we have a national strategy that we describe as "flexible response." Our deterrence policy and the strategy that implements it requires a complete spectrum of military capabilities and high confidence in our control procedures, but it still depends primarily on offensive weapon systems for a deterrent balance.

President Reagan has asked that the Nation's scientific community once again lead the way to a better defense, and we are working to begin that process even though it will probably take us many years of sustained and innovative technological development. I believe we can be successful if we can muster the collective commitment the effort will require.

I believe this because the weapons of war, and nuclear weapons in particular, come in both evolutionary and revolutionary steps. This is illustrated on these two charts.

[DELETED]

NUCLEAR EXPLOSIVE EVOLUTION

1ST GENERATION 1945-55, FISSION

2ND GENERATION 1955-PRESENT THERMONUCLEAR

BLAST, HEAT
INDISCRIMINATE
ALL DIRECTIONS

[DELETED]

We have witnessed the first two major revolutions in nuclear weapon capabilities, and we are now seeing the first indications that a third generation is possible. There have also been continuing evolutionary improvements.

This new generation of weapon concepts places a very great responsibility on those of us who manage the programs and also on those in the Congress who reflect and to a great extent influence the national will. The judgments which we must make are perhaps larger than the decision to move from the first to the second generation of nuclear weapons.

I believe that we must proceed with this research, and with high priority. When a technology begins to mature, we do not yet know of a way to keep it from our potential enemies. The Soviets have repeatedly demonstrated their willingness to press every advantage we allow them. Conversely, if we are successful in directing this technology toward truly defensive initiatives we can progressively become less dependent on offensive systems for our defense. This can lead to a safer and more stable world.

CONCLUSION

In conclusion, I hope I have demonstrated for you that the DOE weapons program is a national resource whose contributions to the national security are broader and more diverse than just the weapons that are produced, and that this resource is operating close to margin of effectiveness. What is to be done with this resource is truly a question of national strategy. In large measure, the United States depends on advanced technology for deterrence and how we nurture and deploy, so to speak, that technology is indeed a national strategy question. In the short term, it is not as momentous a question as some that make the headlines. However, in the long term, it may be more important to our national security, considering the leverage which this technology can have and the risks associated with allowing us to be surprised.

Although this program has been subject to annual review in the administration and the Congress [deleted] I urge you, Mr. Chairman and members of the committee, to view the programs you will hear described during the next several hours of testimony in this light—that they are matters of long-term, national security strategy having to do with a major national resource.

The basic strategy issues involved here could have two outcomes. You could keep the program going just enough to get by, perhaps even satisfying most of the DOD's immediate, identified needs, perhaps gaining slightly on the burdens imposed on the program because of environmental and safeguards concerns, perhaps even doing some high-quality exploratory development in a few carefully selected areas (or what may be more likely, doing a marginal job over a larger range of areas because we do not know what the potential adversary is doing and we must be able to cover all the bases to some extent).

The other alternative is to take steps to begin a true revitalization of this program so that there will be no question that it is second to none; so that we will not be surprised by Soviet developments whose nature we might not even understand when we see them because we have not done the work ourselves; and so that the future applications of these incredible sources of energy will be used for deterrence in the causes we all support.

DOE PROGRAM LIMITATIONS IMPOSE RISK

Dr. WAGNER. Mr. Chairman, in the past, in this particular hearing, we have talked in some detail about the nuclear weapons systems and how they relate to deterrence and overall national security objectives. Much of that is included in Department of Defense testimony in other form, and I would prefer, in the short time we have, to address the Department of Energy nuclear weapons program in a somewhat more general way as we see it in DOD, and if I may use a few view graphs, I'd like to go up here and talk from them. [Chart deleted.]

As we look at the overall program, we see these three general observations. [Deleted.] I will describe briefly ways in which we do that.

The DOE technology base strengthens deterrence in a lot of ways besides just developing weapons for production and [deleted].

ENSURING THAT DOD REQUESTS ARE FOR ONLY WHAT IS ACTUALLY NEEDED

[Chart deleted.] On this first point, [deleted].

[Deleted.]

[Deleted.]

[Deleted.]

Dr. WAGNER. The DOE is placed in a somewhat difficult position, because they—DOE certainly responds with will to specific requests for the stockpile. But, the DOE structure supports the Department of Defense in other ways, beyond just weapons for the stockpile, and that support comes out of the DOE technology base, and we in DOD are very concerned about the general health of that base.

NUCLEAR DETERRENCE INFRASTRUCTURE

Let me show you some ways in which that base strengthens deterrence.

DOE TECHNOLOGY BASE CONTRIBUTES TO THE BROADER "NUCLEAR DETERRENCE INFRASTRUCTURE"

- NUCLEAR WEAPONS EFFECTS AND SURVIVABILITY
- NUCLEAR WEAPON SYSTEM DESIGN
- ANTI-TERRORIST SECURITY
- REACTORS FOR SPACE AND MILITARY BASE POWER

[DELETED]

- NUCLEAR INTELLIGENCE

Dr. WAGNER. An important part in the equation is the survivability of our weapons; the effects produced by them; the effects produced by Soviet weapons on the survivability of U.S. weapons. DOE, for years, has maintained a rather extensive activity in those areas. We depend on that a lot. It has been cut back as their budget difficulties occurred during the 1970's; I think, perhaps, cut back too far. We are suffering to some extent from it, but they still continue to support us in that area.

In addition to designing warheads, they help us design the systems, as well. This is partly to compensate for what I believe is a rather skimpy infrastructure in the Department of Defense itself, [deleted]. We are currently engaged in a program to upgrade the security of our nuclear weapon storage sites against the terrorist threat. It's a large program. It is carried out within NATO. We could not have done it without the support that the Sandia Laboratories gave us, and continue to give us. The Sandia people are a continuing presence in the European theater. We simply could not do without that kind of support. Let me jump to another point. [Deleted.]

[Deleted.] DOE provides some things that we simply could not get from internal DOD resources. Now, this is work that's done mostly on a reimbursable basis with Department of Defense funds; however, it relies on the technology base that has grown in DOE over the years, which we would hate to see eroded or not put back in tip-top condition.

DOE TECHNOLOGY BASE

As you know, the Department of Defense is embarking on an overall high-technology upgrade of our conventional forces.

DOE TECHNOLOGY BASE CONTRIBUTES TO DOD'S NONNUCLEAR CAPABILITY AS WELL

SOME EXAMPLES

- NONNUCLEAR ADVANCED MUNITIONS
- NONNUCLEAR DIRECTED ENERGY WEAPONS
- ARMOR
- BATTLEFIELD SENSORS
- SUBMARINE QUIETING AND HYDRODYNAMIC EFFICIENCY
- ASW SIGNAL PROCESSING
- CHEMICAL WARFARE DEFENSE

Dr. WAGNER. The DOE laboratories contribute a lot to that, in the area of nonnuclear munitions, nonnuclear directed-energy weapons, armor designs, battlefield sensors, submarine quieting, chemical warfare defense—last, but certainly not least. There is a tremendous technology base there. DOD depends on it, and we feel it should be kept as strong as possible.

[Deleted.]

[Deleted] feel that it's very important in addition to producing weapons for the stockpile, to support their technology base.

Senator DOMENICI. [Deleted.] It seems to me the funding level the last 3 years has been going up substantially. Is that not a question of funding—it has——

Dr. WAGNER. Mr. Chairman, it has been going up, but most of the increase has been for production of specific weapons for the stockpile. We have tried to limit the production requests as much—and have, we believe—as much as we can. It is funding for the technology base that I believe is important to focus on, to rebuild a truly healthy capability in this area.

[Deleted.]

Dr. WAGNER. I certainly think we should.

Senator DOMENICI. Well, why don't we? [Deleted.]

Dr. WAGNER. [Deleted.]

Senator DOMENICI. I would think so.

Dr. WAGNER. [Deleted.]

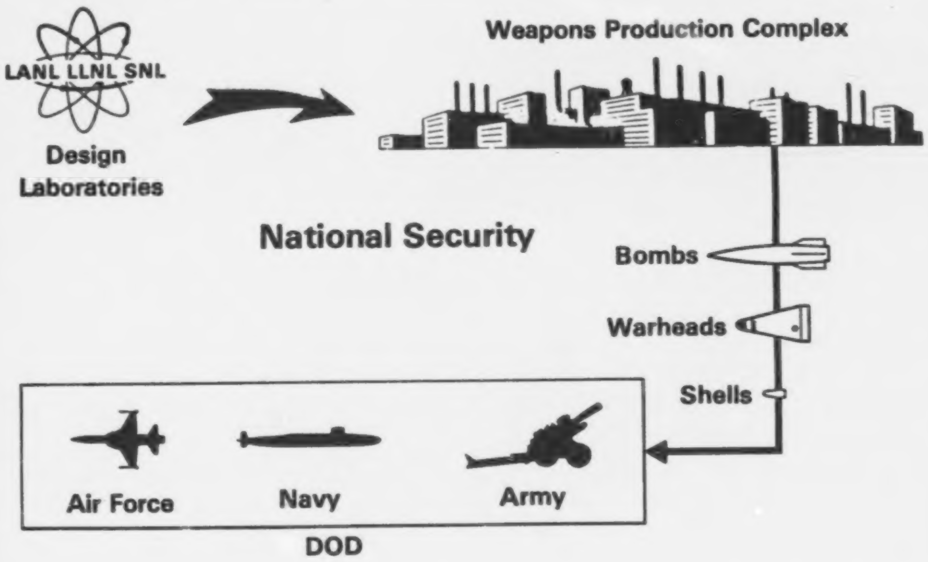
Senator DOMENICI. Is that a legitimate area of concern, General? That he's just expressed?

General HOOVER. Yes, sir.

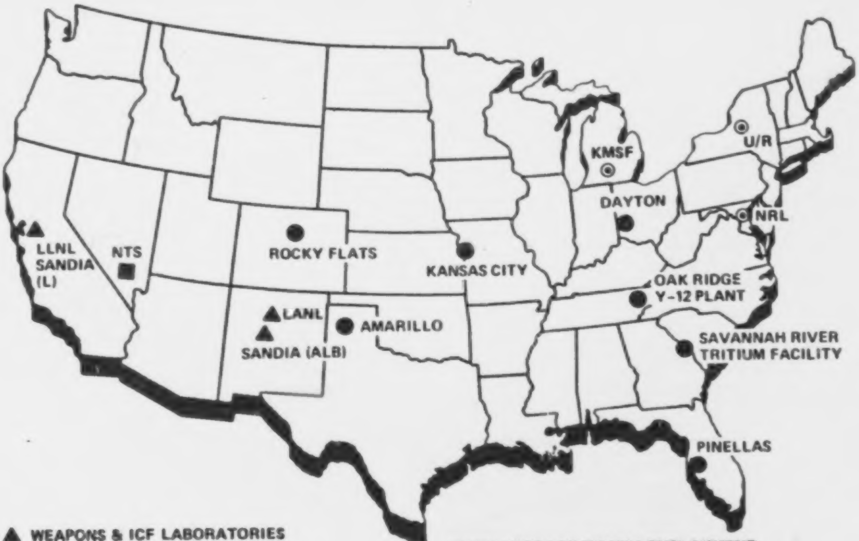
Mr. MORGAN. We have reorganized the Department, and within defense programs, now we do have a Deputy Assistant Secretary for Intelligence, who is working that arena—the CIA and other sides of the intelligence community—to solve that problem, Mr. Chairman. So, we are addressing that now with the organization, and it's working quite a bit better than it was before. [Deleted.] If I may, sir, I'd like to briefly go through a few slides here that I've pulled out.

The weapons complex, of course, starts with three design laboratories, where they do all the development work.

DEFENSE PROGRAMS – WEAPONS ACTIVITIES


LANL LLNL SNL
Design Laboratories
Weapons Production Complex
National Security
Bombs
Warheads
Shells
Air Force
Navy
Army
DOD

DEFENSE PROGRAMS — WEAPONS ACTIVITIES


LLNL
SANDIA
(L)
NTS
ROCKY FLATS
KANSAS CITY
LANL
SANDIA (ALB)
AMARILLO
KMSF
DAYTON
U/R
NRL
OAK RIDGE
Y-12 PLANT
SAVANNAH RIVER
TRITIUM FACILITY
PINELLAS

▲ WEAPONS & ICF LABORATORIES
● WEAPONS PRODUCTION FACILITIES - MA
■ NEVADA TEST SITE
⊙ ICF SUPPORT CONTRACTORS

39,000 AVERAGE FY 1984 EMPLOYMENT
2,030 SQ. MILES OF LAND (ABOUT THE SIZE OF DELAWARE)
24 MILLION SQ. FT. FLOOR SPACE
250,000 ITEMS OF EQUIPMENT
$13 BILLION ESCALATED ACQUISITION COSTS IN FY 1985 DOLLARS

Mr. MORGAN. This single line weapons production complex makes bombs, warheads, and the shells for the DOD. Where do we do that? As you know, we have several production facilities that actually make the various components and they're assembled at Amarillo, Tex., and then shipped off to the DOD. We have three support facilities working on inertial confinement fusion as well as the three weapons design laboratories.

WEAPONS ACTIVITIES

INVESTMENT STRATEGY FOR 1984 AND BEYOND

- MEET PRODUCTION NOW AND IN THE FUTURE

[DELETED]

- INCREASE RD&T MANPOWER 15 PERCENT
- INCREASE TESTING

[DELETED]

- REVITALIZE AGING PLANT
    - —RESTORATION
    - —RD&T FACILITIES
- IMPROVE CERTAIN WEAPONS IN THE STOCKPILE
- PROVIDE MANAGEMENT AND MANUFACTURING FLEXIBILITY

Mr. MORGAN. The investment strategy that we're working for fiscal year 1984 and beyond includes meeting production now and in the future, including a surge capability. We also want to increase our RD&T manpower by 15 percent; increase our test capability [deleted] revitalize the aging plant; improve our weapons in the stockpile; and provide manufacturing flexibility.

Just where are we in the production at this point in time? We are actually building warheads in this budget for nine separate weapons systems.

AMARILLO FACILITY

Senator DOMENICI. I want to ask you a question about the production capability that Amarillo brings to mind. Is there any evidence that the Catholic bishop in that area is having any impact on personnel?

Mr. MORGAN. He is not at this time, sir.

Senator DOMENICI. And, the Department's aware of that, and watches that?

Mr. MORGAN. Yes, sir, we are.

Senator DOMENICI. Any other areas where religious conviction is having any impact on your ability to keep personnel and perform your mission?

Mr. MORGAN. [Deleted.]

WEAPON BUILDS

[Deleted.]

WEAPONS ACTIVITIES

FY 1985 WEAPONS PROGRAM BUDGET SUMMARY

- THE BUDGET

—MEETS ALL NWSM REQUIREMENTS

—SUPPORTS GROWTH IN STRATEGIC DEFENSE INITIATIVE

—CONTINUES RESTORATION PROGRAM

—CONTINUES FY 1984 TEST REVITALIZATION PROGRAM AND INITIATES RD&T PROGRAM

—SUPPORTS LONG-TERM COMMITMENT TO ENVIRONMENT, SAFEGUARDS, AND SECURITY

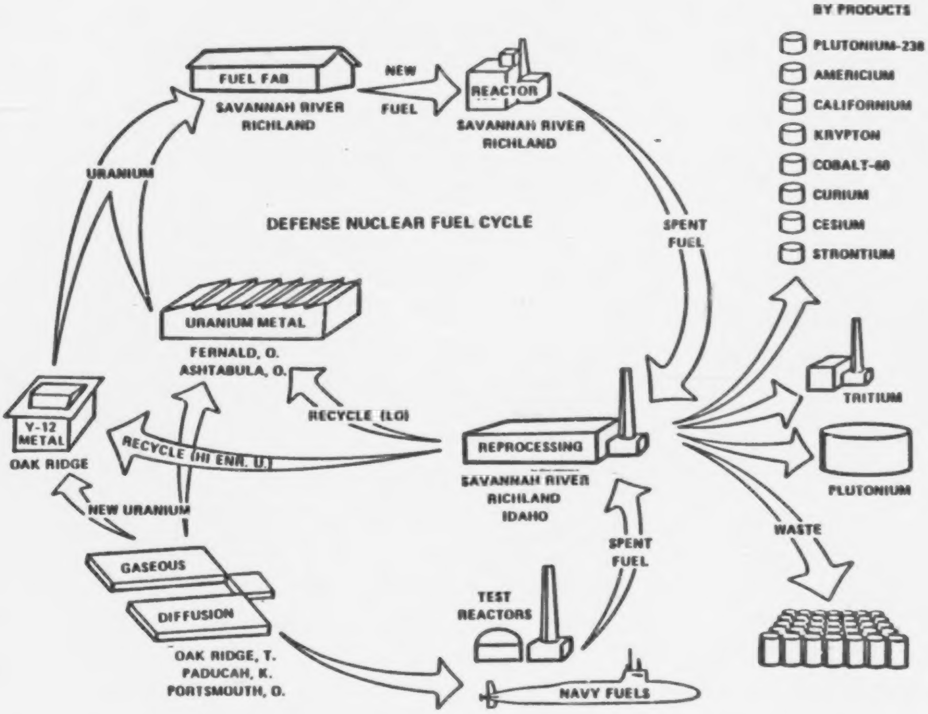
—SUPPORTS VIABLE ICF PROGRAM

—CONTINUES STOCKPILE IMPROVEMENT PROGRAM

Mr. MORGAN. The budget meets the Nuclear Weapons Stockpile Memorandum requirements, supports growth in activities related to the strategic defense initiative, continues the restoration program, implements an expanded revitalization effort to include R&D, and supports long-term commitments. We have a viable ICF program, and we are continuing the stockpile improvements program.

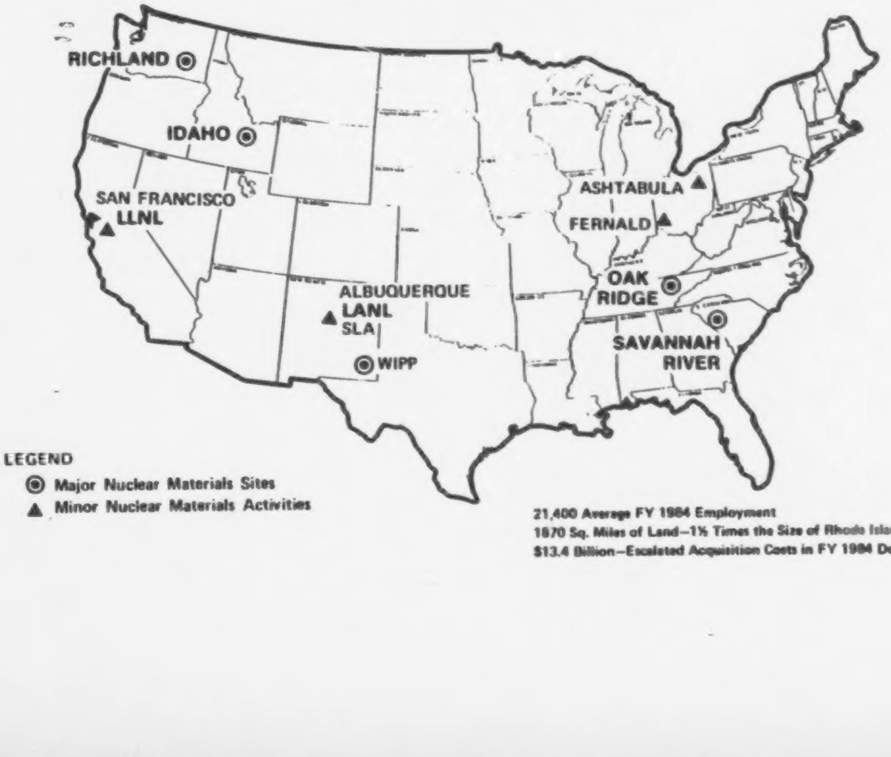
NUCLEAR MATERIALS PRODUCTION

Going to the nuclear materials production side. This is what the process of materials flow in DOE looks like. We have, first, the raw material coming in from our enrichment and feed plants. It is enriched in the gaseous diffusion plants and delivered to Y-12. We also have depleted uranium going into the system. We then fabricate fuel elements and targets, both at Savannah River and Richland, which are irradiated in the reactors; then we take the spent fuel and targets out; reprocess them, deliver the recovered materials to the weapon component manufacturers, and store the waste. The facilities that we use in materials production basically are shown on this chart.


DEFENSE NUCLEAR FUEL CYCLE
FUEL FAB
SAVANNAH RIVER
RICHLAND
NEW
FUEL
REACTOR
SAVANNAH RIVER
RICHLAND
URANIUM
SPENT
FUEL
BY PRODUCTS
PLUTONIUM-238
AMERICIUM
CALIFORNIUM
KRYPTON
COBALT-60
CURIUM
CESIUM
STRONTIUM
URANIUM METAL
FERNALD, O.
ASHTABULA, O.
Y-12
METAL
OAK RIDGE
RECYCLE (LO)
RECYCLE (HI ENR. U.)
REPROCESSING
SAVANNAH RIVER
RICHLAND
IDAHO
TRITIUM
PLUTONIUM
WASTE
NEW URANIUM
GASEOUS
DIFFUSION
OAK RIDGE, T.
PADUCAH, K.
PORTSMOUTH, O.
SPENT
FUEL
TEST
REACTORS
NAVY FUELS

DEFENSE PROGRAMS — NUCLEAR MATERIALS

NUCLEAR MATERIALS SITES

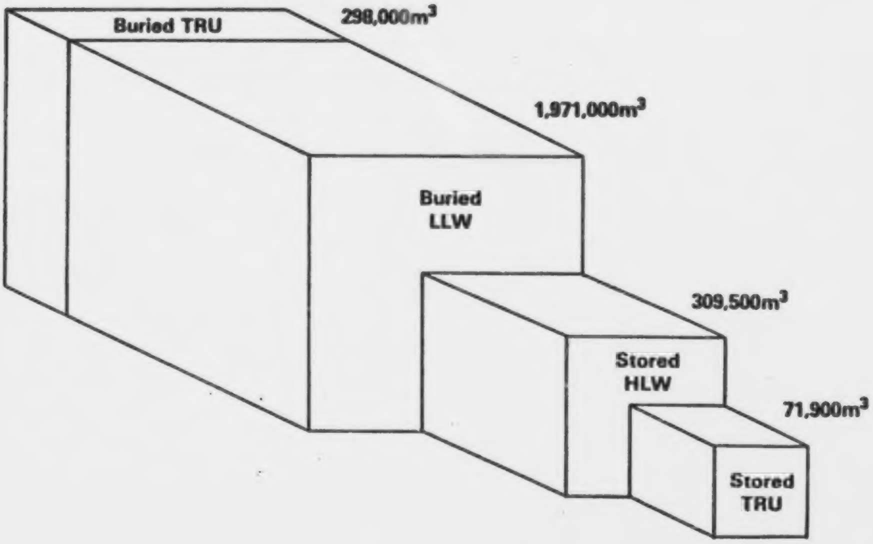

RICHLAND
IDAHO
SAN FRANCISCO
LLNL
ALBUQUERQUE
LANL
SLA
WIPP
ASHTABULA
FERNALD
OAK
RIDGE
SAVANNAH
RIVER
LEGEND
Major Nuclear Materials Sites
Minor Nuclear Materials Activities

21,400 Average FY 1984 Employment
1670 Sq. Miles of Land—1½ Times the Size of Rhode Island
$13.4 Billion—Escalated Acquisition Costs in FY 1984 Dollars

[Deleted.]
[Deleted.]

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

Defense Waste Inventory



Mr. MORGAN. Briefly, on the defense waste and byproducts, this is the amount of waste that we have in the defense inventory. We're dealing withthat adequately at this point in time.

SAFEGUARDS AND SECURITY

Our major concern is public health and safety, and disruption of our stockpile capability.

SECURITY AFFAIRS

SAFEGUARDS AND SECURITY

MAJOR CONCERNS

- ENDANGERING PUBLIC HEALTH & SAFETY
- DISRUPTION OF THE NATION'S STOCKPILE
    - —MAINTENANCE OF CURRENT STOCKPILE
    - —NEW PRODUCTION

SECURITY AFFAIRS

SAFEGUARDS AND SECURITY

DOE SAFEGUARDS AND SECURITY PLANNING AND PROGRAMMING

- THREAT
- SITE VULNERABILITY ASSESSMENTS
- SITE SAFEGUARDS AND SECURITY PLANS
- SENIOR MANAGEMENT REVIEW
- PROGRAM FORMULATION
- BUDGET FORMULATION
- INSPECTION AND EVALUATION

Mr. MORGAN. [Deleted] our inspection and evaluation team—we're doubling that capacity—so from headquarters we will evaluate our critical facilities every 18 months to ensure that our security is adequate.

LESSONS LEARNED

We needed corporate commitment, education and awareness, and reduction and consolidation of inventory.

SECURITY AFFAIRS

SAFEGUARDS AND SECURITY

MAJOR LESSONS LEARNED IN PAST YEAR

- CORPORATE COMMITMENT
- SECURITY EDUCATION AND AWARENESS
- REDUCTION/CONSOLIDATION OF SNM INVENTORY
- DEFENSE IN-DEPTH
- CROSS FERTILIZATION AMONG FIELD OFFICES
- COST EFFECTIVENESS

Mr. MORGAN. We are moving strategic materials away from potential vulnerabilities. We now have defense in depth at all DOE critical facilities; cross-fertilization in communication between field facilities; and we believe that we are cost effective.

MAJOR CONTINUING ACTIONS

We have major continuing actions, such as implementation of the NSC directive. As you know, we just had hearings on air-space restrictions to restore restrictions at all our primary facilities. We were taken to court on the physical fitness standards. We lost that case on a procedural process. We're going back and correcting that, and we should have that in place soon. And, as I mentioned, we're expanding our inspection and evaluation activities.

SUMMARY OF SAFEGUARDS AND SECURITY ACTIVITIES

In summary, [deleted] until we can get all the essential projects properly funded and completed, we have increased manpower at the various locations to ensure security. We do have an aggressive oversight program.

And that is what I tried to summarize because of the time commitment, sir, and I appreciate your hearing it.

[Deleted.]

Senator DOMENICI. Let me suggest that Senator Abdnor, who was a member of the subcommittee, as I am, is here, and will complete the hearing. I regret that I have to go. I want to say to all of you that I hope you don't think that this Senator thinks what you're doing deserves only 45 minutes to an hour of time. I'm sorry that we just get caught in this particular bind. It's tremendously important and some of you know that I'm personally very interested in this particular aspect of the DOE and the defense budget. But, I'm going to have to submit questions that I have in writing and I thank you all very much for accommodating me today and we'll do our best. If the subcommittee, after the staff has reviewed and summarized for the members and the chairman—if we have any need for additional information, we'll obviously get hold of you and we appreciate your cooperation.

Senator, will you take over?

Senator ABDNOR [presiding]. Yes, sir, thank you. It's been pointed out to me that General Hoover and Dr. Gilbert really haven't had much of an opportunity to cover their areas. Would you care for a little additional time to give us a little more background?

Mr. MORGAN. Sir, we did submit their testimony for the record, and I tried to summarize that, but I did eliminate a number of the graphs that we were going to cover, and if you would like, we can spend some more time going through the specifics we'd like to cover, and General Hoover can talk in more detail about his program.

Senator ABDNOR. Why don't we do that.

WEAPONS PROGRAM

General HOOVER. I'm Major General Hoover, sir. Mr. Morgan did summarize the key points that we wanted to make; however, I would like to emphasize several of them. If you compared the weapons complex to a high-technology corporation, it would rank in the top quarter of the Fortune 500. But more importantly, it is [deleted]. And as such, I would certainly caution against cutting the [deleted] capability and capacity very close to the point of being able to produce or not. It's important to have some hedge against uncertainty.

I also believe that, although there are disparate views with regard to nuclear weapons, as long as we have them in the stockpile, as long as they are the underpinning of our deterrent strategy, the American public has the right to be assured that the weapons, and the facilities required for their design and production are safe and secure, and environmentally acceptable. Our budget shows increases and in many instances these increases are to address those very concerns to improve our security and our environmental compliance. Although we are not presently endangering the health or the safety of the American public, there are a number of areas where we must comply with environmental regulations to redress problems resulting from practices that were acceptable in the past. A large portion of the increase in our budget is devoted to those—what I would call cross-cutting—functions that may not of themselves necessarily turn weapons out the door, but are crucially important to keep the confidence of the American public and to maintain our ability to do our job.

We have talked in terms of providing the kind of weapons complex that can meet the security requirements of this decade and of the future as we presently foresee them. Just like any good corporation, we have what we would call an investment strategy. It is not dependent on an ad-hoc or short-term view of what we might do in any 1 year, but rather lays out a program which we will work toward in the longer term.

WEAPONS COMPLEX CAPABILITIES

We believe we should have a weapons production complex that is capable of producing [delete] of the modern new weapons such as we produce today, with a capability to surge by [deleted]. We should increase our research and development manpower by about 15 percent from where we entered this decade—up from an employment level of about 7,400, to a level of about 8,500. The current budget request will support a level in our laboratories of about 8,250, so, we are working toward our goal.

TESTING

We should be increasing the number of underground tests, recognizing also that those tests are becoming more expensive because they are more complex. We are working very, very diligently at getting more data out of each individual test. Therefore, although you can view the viability of our test program by the discrete numbers of tests we do, it's important to look at its quality as well. Quality relates to how much information we are, in fact, receiving from each and every test. Our test program has shown increases in funding support with the help of this committee, support which is reflected in a program that has a great deal more quality than it had a decade ago.

RESTORATION

Mr. Morgan also referred to our effort to restore the aging plant that was allowed to deteriorate during the decade of the 1970's. We've had a very aggressive program which, again, has been supported by this committee. We need to continue that program to completion. In addition to restoring our degraded utilities and equipment, we are also embarking on a program this year to revitalize our research and development facilities to support the manpower base which I have discussed.

STRATEGIC DEFENSE INITIATIVE

Perhaps one other area I should mention because of the importance and interest this year is our effort to support the President's strategic defense initiative to provide a defense against ballistic missiles for this country. We view the President's challenge as visionary, but certainly not impossible. Much of what DOE is doing in strategic defense is, in fact, exploring new concepts that have been emerging from our technology base. We are now giving that added emphasis. Our primary area of endeavor is in the so-called nuclear-directed energy weapon category, where we are pursuing efforts to take a portion of the energy from a nuclear weapon, focus it, and deliver it over several thousand kilometers in a destructive mode. That is, in essence, a new generation of uses for nuclear weapons. We are pursuing concepts such as the nuclear-driven x-ray laser, [deleted].

[Deleted] I think that about fills in what Mr. Morgan had not had a chance to cover.

IMPACT OF BUDGET REDUCTIONS

Senator ABDNOR. You have an ambitious program, and maybe this has been asked, but what do the proposed budget cuts do to all these programs? Does anyone know where the cuts are going to come?

Mr. MORGAN. We have not had any cuts specifically identified to the DOE portion of the budget. We are aware that there are some concerns about the budget. What would drive our budget is if there are reductions in the DOD requirements for the weapons, and we don't know—in other words we have seen no change in the DOD budget and the delivery of weapons required, so that we do not believe that we could sustain a cut and still be responsive to the Presidential nuclear weapons stockpile memorandum.

Senator ABDNOR. That's fine, but all this apparently has developed over a very short time. I was as surprised as anyone. I'm not a member of the Budget Committee, but I can read, and it sounds like they are getting together on a pretty sizable cut, and that doesn't seem to be enough for the other groups that are around here. Do you really think you could survive without being affected by all this—or is it all going to come out of other areas of the defense budget?

Mr. MORGAN. No, it would come from some other area of the defense budget. We've done some preliminary reviews of other production alternatives such as the Mark 15 high productivity reactor cores, and the materials production budget has something like $90 million for enrichment requirements in the DOE budget to support Mark 15. By looking at other alternatives to use the reactors in Savannah River, for example using a different core loading than Mark 15—we could reduce our budget by about $100 million—and not affect production. We're looking at areas we could possibly cut, but in the areas of environmental, safeguards and security, and the safety items, we just believe it is inappropriate to offer any of these up for reduction.

Our growth has consisted of $288 million just to take care of the additional production workload, and we've got an increase of $68 million to enhance the RD&T. There's a $51 million increase in the facilities restoration budget and $44 million on continued construction projects that were authorized in fiscal year 1984 and earlier. For safeguards and security, there's a total increase from the base 1984 budget of $121 million. There's an increase in environmental protection of $77 million; $80 million for the strategic defense initiative. The materials production initiatives budget is $180 million, $90 to $100 million of which we believe we can reduce and not materially affect it. The other increase is some $281 million for inflation, [deleted].

Senator ABDNOR. I want you gentlemen to know one thing, I've been a pretty good supporter. I'm not out trying to make cuts, but there are those who are very interested in it, and it's very apparent to me that there is going to be, and I don't suppose anyone knows quite where the ax is going to fall. I don't know who made the decision to accept the cut, but it sounds like that has been done, so you might be in for a surprise, too, before they get through, here. I assume, and I'll tell you, instead of asking you, that they have to make a lot of cuts. I mean, I don't know how many billion we're talking about, but somewhere in the range of 7½ to 13½ percent or something like that, so, that's going to be a pretty sizable amount. I'm sure you people must——

Dr. WAGNER. On the DOD side, of course, the cut is down to $290 billion.

Senator ABDNOR. Do you think that's where it's all going to come from, then?

Dr. WAGNER. And, if in meeting that, the Department of Defense chooses to cut back on some nuclear weapon systems, then there will be commensurate savings on the DOE side. The cut beyond that, I would argue, could turn out to be a false economy, because what it would do is increase the risk to the programs, and therefore, the risk—they're going to have to come back and spend more money to rectify mistakes later on.

General HOOVER. I'd like to make a comment, if I might, sir, and it goes back to the fact that the weapons complex in the Department of Energy is a [deleted]. It's not like we would be cutting back in a marginal sense on an industrial base across the country. It's not like the aircraft industry, for example. If there were some cutbacks in specific aircraft systems by the Department of Defense, you would affect certain producers, but you would still have the capability. When you cut back on the nuclear weapons complex, it's a unique, single-line infrastructure. There's no other place to go if you need to restart quickly and, therefore, I think it's very dangerous to just tar us with the same brush—a certain percentage cut—just because it's labeled defense programs. That's what concerns me.

Senator ABDNOR. Well, I think those are good points to make, and probably it's good to have it for the record, because those points, I'm sure, will have to be taken into consideration when decisions are made.

This committee, if it comes to that, will have to make the cuts. They'll have to do it depending on the Budget Committee—and the final budget resolution.

MX MISSILES

If we limit the number of MX missiles in fiscal year 1985, what will be the savings in the DOE warhead program?

General HOOVER. In fiscal year 1985, sir, there will be no savings in the Department of Energy's budget request. We are already committed to produce the number of warheads to support 10 MX missiles for their initial operating capability. The construction funds requested in the fiscal year 1985 budget and the operating funds for procurement of bits and pieces and manpower to support those production efforts basically will support those MX missiles which have already been funded in the Department of Defense. So, any cutback in this year's Department of Defense MX missile buy may affect out-year funding needs of the Department of Energy. If the Department of Energy were cut, it would affect our capabilities to deliver the warheads for the missiles that have already been authorized and appropriated for procurement within the Department of Defense.

Senator ABDNOR. In other words, you're saying the MX can be reviewed for cuts in 1986 or 1987, maybe, but not 1985. But, again, if we're going to make cuts, and if there are cuts within Defense, you say it can't be made in this area and it can't be made in MX in 1985. But certainly I don't think any of us want to start cutting back on the salaries and wages which make up 47 to 48 percent of the Defense budget. Where do we go to make these cuts? I mean, we've got to talk about 1985. That's what they're telling us.

Mr. MORGAN. But, within the supporting process that we have, we've looked at the area of potential cuts and have identified about $100 million that we could cut in material production [deleted]. We're looking at a different loading of the reactors, but we strongly believe that cuts below that would affect the deliveries that we are required to meet for DOD. Now, if the cuts within the DOD changes in weapon systems, then, of course, we would look at those in a different light. I don't believe that it's our process to tell the DOD what to cut on the defense activities.

Dr. WAGNER. Sir, you chose one example that, just by accident, turns out to be a place where a DOD cut would not reflect in a DOE cut. There might be some other areas. For instance—to pick one at random—I don't know whether DOD will do this—if one were to delay production of the B–1 bomber, I could imagine slowing down production on some of the bombs—the new bomb that's being developed partly for the B–1. So, there are some areas where DOD cuts would have transfer to DOE cuts, but the MX is not one of them.

Senator ABDNOR. Good points, because it's awfully easy to talk about where we ought to go make these great reductions. You know, every time you talk about cutting back on deficits, we have a tendency to look at defense, and it's not that simple, either. Just to start whacking out great hunks without a lot of thought behind it. I assume whoever came up with the proposed cuts of the administration must have paid some attention to this.

Dr. WAGNER. We are, of course, in defense, looking hard to come up with exactly what those cuts will be, and I think we will try to take overall DOD-DOE savings into account when they do that, but the DOE is a kind of a small fraction of the DOD—total national security budget. So, looking at this program, for much in the way of savings, I don't think—it's not likely to come from theirs.

Senator ABDNOR. Once again, what is your budget request for fiscal 1985?

Mr. MORGAN. Our budget total is $7.3 billion in 1985.

Senator ABDNOR. And how does that compare to last year's level?

Mr. MORGAN. Up about $1 billion, and that's all those incremental items that I mentioned, are the reason for those increases that we had. Inflation, increased production requirements, increased material requirements, safety environment, and revitalization of the program, and we believe those are legitimate requests in increase, Mr. Chairman.

Senator ABDNOR. Yours is a small part of the total DOD function.

Mr. MORGAN. The weapons—on the nuclear weapons systems, we believe that we are approximately 15 percent of the total system. In other words, just on the nuclear weapons systems—that our budget is approximately 15 percent of the total.

DEFENSE WASTE AND BY PRODUCTS MANAGEMENT

Senator ABDNOR. You were talking a minute ago—who was it, Dr. Gilbert—on waste, was it? Nuclear waste?

Dr. GILBERT. Waste isolation pilot plant. We were discussing it with Senator Domenici, yes, sir.

Senator ABDNOR. I guess I missed most of that, but that should be no problem? On either or both in liquid or solids?

Dr. GILBERT. No, sir, I wouldn't characterize it as being a problem. We have a major backlog of nuclear wastes from about 30 to 40 years of the atomic energy defense activities that we have to dispose of. We have liquid wastes at Richland and Savannah River and solid wastes at Idaho. We have a plan to essentially dispose of those wastes. That plan was submitted by the President to the Congress in June of last year and .we are following that plan essentially on schedule.

DEFENSE WASTE MANAGEMENT PLAN

DEFENSE WASTE MANAGEMENT PLAN DISPOSAL POLICY

—READILY RETRIEVABLE WASTE TO GEOLOGIC DISPOSAL

—ALL OTHER TO BE RETRIEVED IF BENEFITS JUSTIFY COSTS AND RISKS

—OTHERWISE: STABILIZE IN PLACE

—RETRIEVED TRU WILL BE MADE ACCEPTABLE TO WIPP

—IMMOBILIZED HIGH LEVEL WASTE TO COMMERCIAL REPOSITORY BARRING ADVERSE IMPACTS ON DEFENSE PROGRAMS

Dr. GILBERT. Among the major features of that plan is the waste isolation pilot plant in New Mexico, which is intended as a repository for our transuranic wastes, which are mostly plutonium contaminated waste. The high-level waste we plan to vitrify—make it into glass at Savannah River. We will have a vitrification facility which is intended to cast the high-level waste into glass logs which will be stored at Savannah River pending the availability of a geologic repository for high-level waste. The mechanism for getting that repository was established by the Nuclear Waste Policy Act, which Congress passed in 1982. So we have a plan and a program, and we are going ahead with defense waste disposal. We think that, in that sense, we are way ahead of the civil side of the house, but we have a long way to go.

Senator ABDNOR. You are ahead on the civilian side?

Dr. GILBERT. In the sense that we have facilities already started, yes, sir.

Senator ABDNOR. Are they benefitting from your experiences?

Dr. GILBERT. We think they are, and we have offered to share everything we have with them, and they are participating with us in that.

Mr. MORGAN. We will be conducting high-level waste experiments at the WIPP facility, and in effect, sharing that with the Nuclear Waste Policy Act activity, sir.

Senator ABDNOR. That's good, because that's a big issue in a couple of States, and all parts of the country, I guess. I ran into it in South Dakota. It got to be the biggest single issue, I think, almost in our legislature this year—establishing a facility.

Please proceed.

NUCLEAR MATERIAL REQUIREMENTS

Dr. GILBERT. If I may, I have picked out a few of Mr. Morgan's slides that he didn't use, but I'll start with one that he did use. [Chart.] I'm not sure whether you were in the room. [Deleted.] We have enough uranium right now to meet our demands; [deleted].

[Deleted.]

[Deleted.]

[Deleted.] Right now, we need to restart an old facility that we have at Oak Ridge, and we do have a request for $4.9 million in the fiscal year 1984 supplemental to restore that facility which hasn't been operated for about 20 years. That's the only near-term budget impact of the uranium requirement.

MATERIALS PRODUCTION

The budget request for 1985 for materials production is $1.8 billion.

NUCLEAR MATERIALS PRODUCTION

FY 1985 BUDGET REQUEST—BUDGET SUMMARY

[Dollars in millions]

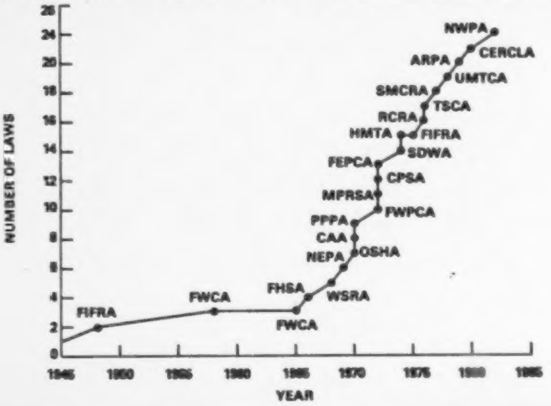
	FY 1984 APPROP.	FY 1985 APPROP.
BASE ACTIVITIES		
CURRENT OPERATIONS	$933.6	$1,105.0
L REACTOR	64.5	65.0
PUREX	88.7	90.8
SECURITY	102.1	96.8
ENVIRONMENTAL	59.3	58.1
SUBTOTAL	$1,248.2	$1,415.7
PRODUCTION INITIATIVES		
RESTORATION	$107.6	$84.5
IDAHO RESTORATION	5.5	14.1
PRODUCTIVITY IMPROVEMENTS	25.3	50.7
MARK 15 CORES	4.0	113.5
SPECIAL ISOTOPE SEPARATION	71.9	39.0
PROCESS FACILITY MODIFICATION	12.5	0.0
REACTOR SAFETY	26.7	25.7
SUBTOTAL	$253.5	$327.5
OTHER		
NAVAL REACTOR SUPPORT	$120.0	$121.0
TOTAL MATERIALS PRODUCTION	$1,621.7	$1,864.2

Dr. GILBERT. I'm not going to go into all of these, but I do want to emphasize a few things. Back in 1981, [deleted] we did several things. We initiated a project to restart a reactor at Savannah River. That reactor is now ready to go pending completion of an environmental impact statement and receipt of discharge permits from the State of South Carolina. We also restarted a processing plant in the State of Washington. It's now operating and operating well. That's what's called "Purex" on that particular chart.

We do have security and environmental concerns, and I'll come back to that in a moment, but we have undertaken some initiatives to try to improve our production capabilities—some further initiatives—and those are listed there. I want to talk to just a few of those. First of all, I borrowed a chart from General Hoover's presentation, here, just to illustrate what's happened to us in the environmental area.

DEFENSE PROGRAMS — WEAPONS ACTIVITIES

LEGISLATION RELATED TO ENVIRONMENTAL PROTECTION



FIFRA – FEDERAL INSECTICIDES, FUNGICIDE, AND RODENTICIDE (1946, 1972, 1975)
FWCA – FISH AND WILDLIFE COORDINATION (1958, 1965)
FHSA – FEDERAL HAZARDOUS SUBSTANCES (1966)
WSRA – WILD AND SCENIC RIVERS ACT (1968)
NEPA – NATIONAL ENVIRONMENTAL POLICY (1969)
PPPA – POISONIOUS PACKAGING PREVENTION (1970)
OSHA – OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA – CLEAN AIR (1970, 1977)
FWPCA – FEDERAL WATER POLLUTION CONTROL (NOW CLEAN WATER) (1972, 1977)
MPRSA – MARINE PROTECTION, RESEARCH, AND SANCTUARIES (1972)
CPSA – CONSUMER PRODUCT SAFETY (1972)
FEPCA – FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA – SAFE DRINKING WATER (1974, 1977)
HMTA – HAZARDOUS MATERIALS TRANSPORTATION (1974)
RCRA – RESOURCE CONSERVATION AND RECOVERY (1976, 1979)
TSCA – TOXIC SUBSTANCE CONTROL (1976)
SMCRA – SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTCA – URANIUM MILL TAILINGS CONTROL (1978)
ARPA – ARCHEOLOGICAL RESOURCE PROTECTION ACT (1979)
CERCLA – COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (1980)
NWPA – NUCLEAR WASTE POLICY ACT (1982)

Dr. Gilbert. You can see that we've had what we physicists would call an exponential growth in the number of laws relating to environment. Those laws are forcing us to undertake a lot of measures at our material production sites, as well as our weapon sites, and that forms part of the reason for the fiscal year 1984 supplemental. We have a supplemental for about $157 million, of which about half is for material production including our safeguards and security activities. In total, $64.3 million is related to safeguards and security improvements and Mr. Morgan talked to that. We really believe that we need to go ahead with those security improvements, and, consequently, that particular item is also in the supplemental.

NUCLEAR MATERIALS PRODUCTION—FY 1985 BUDGET REQUEST

MARK-15 (SR CORES)

[Dollars in millions]

	FY 1983	FY 1984	FY 1985
	BA	BA	BA
MARK-15	$18.7	$4.0	$23.0
URANIUM ENRICHING	0	0	90.5
TOTAL	$18.7	$4.0	$113.5

- MARK-15 CORES INCREASE PU EQ. PRODUCTION [DELETED]
- UNIT COSTS OF PU [DELETED]
- FY 1985 FUNDING PROVIDES FOR PURCHASE OF SEU FROM GASEOUS DIFFUSION PLANTS, COMPLETION OF FACILITY STORAGE MODIFICATIONS, AND INITIATION OF PRODUCTION OF MARK-15 CORES AT OR AND SR
- PARTIAL CONVERSION OF SR REACTORS PLANNED FOR FY 1986

MARK 15 CORES

Mr. Morgan mentioned one of the ways we're trying to improve reactor productivity is with the Mark-15 cores, [deleted] with the Savannah River reactors. It just makes them produce more efficiently. I might say as an aside, we're looking at still another core, [deleted]. If we're able to make that work, and it looks like we can, that will save about $90 million, potentially, from the fiscal year 1985 budget, and we're looking at that very hard. That is a very good possibility, and the Savannah River Laboratory has been looking at that. We think it's potentially very good.

SPECIAL ISOTOPE SEPARATION

I wanted to comment on the special isotope separation program. Dr. Wagner mentioned that and Mr. Morgan, also.

SPECIAL ISOTOPE SEPARATION PROGRAM SUMMARY

- AVLIS PROCESS SELECTED FOR PRODUCTION PROTOTYPE — FY 1983
- [DELETED]
- DOE/OSTP TECHNICAL REVIEW — FY 1984
- AVLIS INTEGRATED EQUIPMENT PROCESS DEMONSTRATION — FY 1987
- PRODUCTION PROTOTYPE OPERATION — FY 1989 (ONE YEAR DELAY)
- FULL PRODUCTION CAPABILITY — FY 1991 (ONE YEAR DELAY)

Last year the Secretary had selected the atomic vapor laser isotope separation process for laser isotope separation of plutonium isotopes. And we are planning to go ahead with a prototype plant at Richland, Wash. [deleted].

NEW PRODUCTION REACTOR

Mr. Morgan mentioned the new production reactor. At the present time, we have a study going on, at the request of the Secretary, to look into several areas concerning a new production reactor.

NEW PRODUCTION REACTOR (NPR)

- NPR WOULD PROVIDE ASSURED SUPPLY OF TRITIUM VITAL TO MAINTAINING NUCLEAR WEAPONS STOCKPILE
- NPR STUDIES UNDERWAY TO SUPPORT REACTOR CONCEPT/SITE SELECTION BY MID FY 1985 FOR RECOMMENDATION TO PRESIDENT

These include site locations, and we're looking at three sites for the reactor: Savannah River, Richland, Wash., and Idaho. We're also looking at three different concepts for the reactor design. We are doing conceptual studies to get a better idea what these reactors would look like. We're doing environmental studies to see what the impact on these various sites would be—if we build a new reactor there of one of these designs. We have written a letter which will inform you of the studies that we have undertaken. That letter will also inform you that we're proposing to go ahead with an environmental impact statement on the new production reactor so that the Secretary can make a recommendation to the President in 1985.

Senator Abdnor. We'll be glad to have you come to South Dakota if you can't find a place elsewhere—I think. [Laughter.]

Dr. Gilbert. Well, we have a lot of interest from all three States, as a matter of fact. There are, of course, some environmental groups who have concerns, but I would say that, in general, we have a very good reception from all three States.

BY PRODUCTS AND BENEFICIAL USE PROGRAM

I just wanted to mention one last thing with respect to the waste management—we have already talked a little bit about it.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

BYPRODUCTS AND BENEFICIAL USE

- CESIUM 137 BENEFICIAL USE PROJECTS
  - —ALBUQUERQUE MUNICIPAL SLUDGE IRRADIATOR
  - —TRANSPORTABLE CESIUM IRRADIATOR
  - —PORT IRRADIATOR
  - —CESIUM AGRICULTURAL COMMODITY IRRADIATOR
- DEFENSE ENERGY PROJECTS
  - —TRITIUM LIGHTING FOR MILITARY
  - —DEFENSE TERRESTRIAL REACTOR
  - —NORTH WARNING SYSTEM
  - —500 WATT THERMOELECTRIC POWER SUPPLY (STRONTIUM 90)

We do have a byproducts program associated with that, which in our current budget is being zeroed out. However, we have enough money left from the fiscal year 1984 budget to complete four irradiators—one for irradiating fruits, oranges, grapefruits, and apples; also a pork irradiator, a portable irradiator; as well as a sludge irradiator that we are helping the city of Albuquerque build. We think we will be able to go ahead and complete those irradiators, and then would expect private industry to pick up that program. We have also had a very successful program working with the military in developing applications of byproducts, such as tritium lights, which were used in the Grenada invasion, and the other applications of radioluminescent lights. We are also doing some studies relating to small terrestrial reactors that the Department of Defense has considerable interest in. Those are the points I wanted to emphasize, sir, so I'll stop at this point.

Senator ABDNOR. How many people are you going to get to try those experimental fruits when you get through with them?

Dr. GILBERT. Let me emphasize that when this food is irradiated, it leaves absolutely no radiation in the food. Gamma rays penetrate through the food, just like microwaves do when you cook something in your microwave oven, but they leave no residual activity. The FDA has recently issued a notice that they intend to approve radiation exposures up to 100,000 rad. It will allow us to do things like kill the med fly that's present in citrus products from both California and Florida; it will allow us to eliminate trichinosis in pork products; it will allow us, with higher dose applications, to sterilize sewage sludge. There are just a whole variety of applications, and they are particularly interesting right now, because of this problem with EDB.

Senator ABDNOR. So, this is part of the answer?

Dr. GILBERT. This may be part of that answer; yes, sir.

Senator ABDNOR. I understand they have found a material that might be just as bad as EDB—they ought to look your way.

Dr. GILBERT. Well, I will point out that the astronauts have been eating irradiated food all along. The Army had a program back a few years ago where they produced irradiated food, and we see no harmful effects from that at all.

PREPARED QUESTIONS SUBMITTED FOR THE RECORD

Senator ABDNOR. Well, gentlemen, I know you've just barely touched on what your program and the 1985 request, but I, too, have to meet some people. I understand we have over 100 questions which the staff has prepared and I'd like to submit those to you for the record.

Senator Domenici also has some questions that he has left for inclusion in the record. And there could be others which we'll get to you if need be. We ask that you give them your prompt attention.

Mr. MORGAN. We would be happy to respond to those.

Senator ABDNOR. Sometimes it's easier to do that than to plan to do it back and forth across the table. We do appreciate the fact that you had to summarize your statements and keep them short. As I say, I know it's a very complicated and detailed subject that many Members don't want to be involved with. It's a big part of this committee and we do appreciate your being with us. I'm sure that the staff will be in contact with you on many occasions before our final decisions are made, and with that, I just want to thank you very much for your appearance today.

[The questions and answers follow:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Inflation and Taxes

Question: What rate of inflation was assumed in this appropriation at the beginning of FY 1984 and what is the expected inflation rate for FY 1984 now?

Answer: We assumed a 7 percent inflation rate for FY 1984. We continue to believe that that rate is appropriate based on our experience to date.

Question: What amount is included to cover inflation or escalation for operating expenses in the FY 1985 request? What percent of the request?

Answer: The amount included in the FY 1985 request for operating expenses to cover inflation is $257,233,000. This represents 4.6 percent of the FY 1985 request for operating expenses which is $5,480,754,000.

Question: How much is included in FY 1985 budget for State taxes? Please provide this by site and State.

Answer: The amount included in the FY 1985 budget for State taxes is $48.8 million. The following table gives a breakdown by site and State.

State, Site	Taxes
California, Lawrence Livermore National Laboratory	$ 0.1
Colorado, Rocky Flats Plant	1.4
Idaho, Idaho National Engineering Laboratory	1.3
Missouri, Bendix Plant	2.5
Nevada, Nevada Test Site	4.4
New Mexico, Los Alamos National Scientific Laboratory	18.9
Ohio, Feed Materials Production Center	1.4
Mound Facility	4.8
South Carolina, Savannah River Plant	2.5
Tennessee, Y-12 Plant	3.5
Washington, Hanford Production Operations	8.0
Total	$48.8

REORGANIZATION OF THE ALBUQUERQUE OPERATIONS OFFICE

Question: Please describe the reorganization of the Albuquerque Operations Office and the redistribution of staffing among the programs.

Answer: The realignment of the Albuquerque Operations Office, which was effective June 12, 1983, involved the consolidation of the Resources Management Division and the Program, Plans, and Budget Division into a new Budget and Resources Management Division. The reorganization further involved creation of a new Management Support Division by abolishing the Sandia Area Office and combining functions of that office with the functions of the Headquarters Services Division.

This realignment provided a more efficient structure for the performance of all budget and support service functions and provided the organization and personnel necessary to recognize the importance of real estate and traffic management. Additionally, the realignment provided for the consolidation of all construction and contract administration activities related to the Albuquerque-based projects and contracts.

This reorganization resulted in a redistribution of 13 Federal full-time equivalents from the Weapons Research, Development, and Testing Program and 24 Federal full-time equivalents from the Weapons Production and Surveillance Program into Weapons Program Direction.

TRANSFER OF MARSHALL ISLANDS PROGRAM

Question: What was the rationale for the transfer of the Marshall Islands and Nevada Dose Assessment Program to Defense Programs?

Answer: All of the Department of Energy programs in the Marshall Islands are a legacy of the atmospheric nuclear testing conducted from 1946 to 1958. The Department's responsibility described in Public Law 95-134 is threefold: (a) to determine and evaluate radiological conditions at the atolls of Enewetak and Bikini that were affected by testing; (b) to provide technical advice and assistance to Government agencies, notably the Department of the Interior and the Department of Defense, for the resettlement of those atolls; and (c) to maintain a medical program for those portions of the populations of Rongelap and Utirik who received acute exposures from radioactive fallout in 1954.

While it may appear that health surveillance activities, such as our Marshall Islands effort, are not defense related, there is merit to the argument that the weapons program caused the problems in the Marshalls and we should assume responsibility. We in Defense Programs, and in our predecessor agencies, have been responsive to the needs of the Marshallese for 30 years now.

MARSHALL ISLANDS FUNDING

Question: Provide a distribution of funding between the Marshall Islands and Nevada Dose Assessment in FY 1984 and FY 1985. Why has the program been reduced from $9.6 million to $6 million in FY 1985?

Answer: The Marshall Islands effort will receive $8.5 million in FY 1984 and $5.4 million in FY 1985. The Nevada Dose Assessment effort will be funded at $1.1 million in FY 1984 and $0.6 million in FY 1985. This effort is scheduled to be completed in FY 1986.

The FY 1984 funding of $9,600,000 includes $4,000,000 in supplemental funding provided under Public Law 96-205 for implementation of a comprehensive health care plan. This supplemental funding will be used to develop health care arrangements described in the Public Law and consistent with Section 177 of the Compact for Free Association.

The provisions of these funds does not assume any future commitment for additional funding for this effort. Responsibility for development of this plan rests with the Department of Interior.

INTERACTIVE GRAPHICS SYSTEMS

Question: Provide a listing of all funding for interactive graphics systems funded throughout the Defense Programs budget for FY 1983, FY 1984, and FY 1985. Show source of funds by location.

Answer: This information is provided for the record.

Weapons Activities
Interactive Graphics Systems
($ in Thousands)

	FY 1983	FY 1984	FY 1985
Lawrence Livermore National Laboratory			
Capital Equipment	$ 0	$ 1,300	$ 4,000
Los Alamos National Laboratory			
Capital Equipment	0	2,475	4,000
Sandia National Laboratories			
Capital Equipment	0	2,775	8,000
Kansas City Plant			
Operating (lease)	1,076	1,290	2,960
Capital Equipment	0	0	7,800
Construction (Project 82-D-111)	800	4,500	3,700
Mound Facility			
Operating (lease)	0	0	115
Capital Equipment	0	2,300	1,900
Construction (Project 82-D-111)	500	300	800
Pantex Plant			
Operating (lease)	0	620	480
Capital Equipment	0	0	900
Construction (Project 82-D-111)	100	1,300	0
Pinellas Plant			
Operating (lease)	0	1,000	1,300
Capital Equipment	0	3,550	0
Construction (Project 82-D-111)	1,000	0	900
Rocky Flats Plant			
Operating (lease)	0	830	830
Capital Equipment	0	0	650
Construction (Project 82-D-111)	400	0	0
Y-12 Plant			
Operating (lease)	0	1,600	3,500
Capital Equipment	0	2,650	2,700
Construction (Project 82-D-111)	1,800	2,500	1,400
Summary			
Operating	1,076	5,340	9,185
Capital Equipment	0	15,050	29,950
Construction	4,600	8,600	6,800
Total	$ 5,676	$28,990	$45,935

CAPITAL EQUIPMENT REQUIREMENTS

Question: Provide a table showing the capital equipment requirements in the various Weapons Activities for FY 1983, FY 1984, and FY 1985. Justify the increase in FY 1985 considering the significant increases in FY 1983 and FY 1984.

Answer: A table outlining capital equipment requirements for Weapons Activities is provided for the record. There are many reasons for increased capital equipment funding. The fundamental need is to slow the physical and technological deterioration of the capital asset base. Additional equipment is also needed to prepare for the increasing workload in FY 1986 and FY 1987, as well as improved safeguards, security, and environmental measures.

(the information follows:)

WEAPONS ACTIVITIES CAPITAL EQUIPMENT
(B/A in thousands)

	FY 1983 Actuals	FY 1984 Estimate	FY 1985 Request
Weapons Activities			
Research & Development			
Basic	$ 45,260	$ 46,900	$ 54,100
Automatic Data Processing	17,240	21,900	29,560
Subtotal, Research & Development	62,500	68,800	83,660
Testing			
Basic	30,500	37,100	43,790
Automatic Data Processing	0	2,500	0
Subtotal, Testing	30,500	39,600	43,790
Inertial Confinement Fusion			
Basic	11,000	11,800	9,500
Production & Surveillance			
Basic	91,200	96,700	115,400
Automatic Data Processing	800	9,700	19,000
Subtotal, Production & Surveillance	92,000	106,400	134,400
Total Weapons Activities	$196,000	$226,600	$271,350

AIRCRAFT ACQUISITION

Question: Please provide a description of and the need for the aircraft included in this appropriation.

Answer: The FY 1985 appropriation includes a request for the Department of Energy to acquire title to one fixed-wing twin engine propeller aircraft, which is a Beechcraft Super King Air, Model 200-C. This aircraft has been leased under a lease-to-ownership contractual agreement. The Department of Energy will acquire title to this aircraft when the final lease payment is made in February 1985. It is a secondary aircraft operated by Ross Airlines to transport cargo, *DELETED* the Waste Isolation Pilot Plant, and other Department of Energy missions assigned to the Albuquerque Operations Office.

STRATEGIC DEFENSE INITIATIVE

Question: Your budget states the feasibility of the Department of Energy directed energy program would not be established until the early-to-mid-1990's, and weaponization would require an additional 5 to 10 years. In terms of billions of dollars, what would you expect such a program to cost?

Answer: The research needed to determine the technical feasibility of nuclear-directed energy weapons concepts for strategic defense will require a substantial effort over a period of years. We expect to spend about $2 billion in 1985 dollars on this work by FY 1989. We have not estimated costs beyond that date.

TOTAL STRATEGIC DEFENSE BUDGET

Question: What range would you expect the total Department of Defense and Department of Energy Strategic Defense Initiative to cost?

Answer: For FY 1985, the Departments of Defense and Energy are requesting a total of approximately $2 billion for the Strategic Defense Initiative. For FY 1986-1989, the two Departments expect that a total of $24 billion will be required.

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Strategic Defense Initiative

Question: What information do we have with regard to the Russian progress in the field of Strategic Defense?

Answer: In open literature articles, the Soviets have indicated an interest in nuclear explosive driven directed energy weapons and they certainly have the demonstrated knowledge and technical capability to do so. **DELETED**

DEPARTMENT OF ENERGY DIRECTED ENERGY BUDGET

Question: How much is included in the budget in FY 1983, FY 1984, and FY 1985 for directed energy programs? Please provide a breakdown.

Answer: For FY 1983, the Department of Energy's expenditures on directed energy research were $64 million. For FY 1984, the expenditures are expected to be about $118 million, and for FY 1985, $210 million.

INERTIAL FUSION

Question: Please explain the reduction in operating funding in the Inertial Confinement Fusion Program.

Answer: The reduction in operating funding for the Inertial Confinement Fusion Program in the FY 1985 budget request is due primarily to the completion of the CO_2 laser evaulation at the Los Alamos National Laboratory and a reduction in HALITE/CENTURION experiments *DELETED*

INERTIAL CONFINEMENT FUSION FUNDING

Question: Please provide a table showing the FY 1983, FY 1984, and FY 1985 funding by location for operating and plant and capital equipment.

Answer: This information is provided in a table for the record.

(the information follows:)

INERTIAL CONFINEMENT FUSION FUNDING
($ in Thousands)

	FY 1983 Approp.	FY 1984 Approp.	FY 1985 Request
Operating Expenses			
Glass			
LLNL	56,100	59,000	55,530
KMS	10,500	10,800	10,170
UR	6,100	6,300	0
NRL	2,400	2,500	0
Subtotal, Glass	75,100	78,600	65,700
Gas			
LANL	41,800	43,400	30,505
Pulse Power			
SNL	20,000	21,200	19,800
Direct Drive			
UR	0	0	5,890
NRL	0	0	2,355
Subtotal, Direct Drive	0	0	8,245
Supporting Research	3,100	1,800	750
Total, Operating	140,000	145,000	125,000
Capital Equipment			
LLNL	4,495	4,600	4,000
LANL	2,595	2,800	2,000
SNLA	1,200	1,300	1,000
Other	2,710	3,100	2,500
Total, Capital Equipment	11,000	11,800	9,500
Construction			
81-D-101, PBFA II, SNLA, TEC $45,650	4,250	12,900	3,500
78-4-a, NOVA, LLNL, TEC $176,000	34,500	0	0
Total, Construction	38,750	12,900	3,500
Total, Inertial Confinement Fusion	189,750	169,700	138,000

ANTARES PROJECT

Question: What was the total estimated cost to construct the ANTARES project?

Answer: The total estimated construction cost of the ANTARES project was $62.5 million. The final costing has not yet been completed, but it appears to be within the estimates.

ANTARES PROJECT

Question: When was the ANTARES project completed?

Answer: On November 8, 1983, the project successfully fired all 24 laser beams into the target chamber, which was the criteria for the successful completion of construction.

ANTARES EXPERIMENTAL PROGRAM

Question: What are the scientific and technical results you expect from this project?

Answer: The carbon dioxide gas laser program at the Los Alamos National Laboratory has the primary purpose of evaluating the target physics and feasibility of long-wavelength fusion drivers. ANTARES will be used to evaluate candidate target concepts for long-wavelength laser radiation and to validate energy scaling laws at five times the energy levels available previously. This evaluation will include variations in pulse duration and shape not accessible with other facilities. Important to both the Inertial Fusion Program and to the Weapons Physics Program, ANTARES will be used to study the generic physics of unstable hydrodynamics and fuel compression and will make significant contributions in evaluating directed energy weapons concepts.

ANTARES OPERATIONS

Question: Does your budget support operating this facility after FY 1984? How long in FY 1985?

Answer: Yes. The proposed Los Alamos National Laboratory FY 1985 budget of $30.5 million includes the operation of ANTARES through the first half of FY 1985.

ANTARES PROJECT

Question: How long was the planned operation of the facility when it was first proposed for construction?

Answer: It was the plan to have a minimum of 2 years of target experiments starting in FY 1984.

ANTARES OPERATING FUNDS

Question: What additional funds would be required to operate the facility fully through FY 1985?

Answer: Our request of $30.5 million for the Los Alamos National Laboratory Inertial Fusion Program will provide for adequate ANTARES experiments during the first half of FY 1985. To operate ANTARES fully for all of FY 1985, along with full Inertial Fusion Program support, would require an additional $14 million.

NOVA PROJECT COMPLETION

Question: When will the NOVA project be completed?

Answer: The NOVA laser project is proceeding on schedule and within budget. NOVA construction is scheduled to be completed in the first quarter of fiscal year 1985.

NOVA SCIENTIFIC CONTRIBUTIONS

Question: What scientific and technical information will the operation of this project add to the Inertial Confinement Fusion Program and the development of nuclear weapons?

Answer: The NOVA project will expand greatly the physics data base necessary for successful applications of inertial confinement fusion. NOVA also will contribute to a broad range of nuclear weapons physics experiments; approximately 25 percent of NOVA operation will be dedicated solely to weapons physics experiments.

NOVA AND DIRECTED ENERGY WEAPONS

Question: What will this project add to development of directed energy weapons?

Answer: The NOVA project will contribute to a broad range of weapon physics developments, including directed energy weapons. For example, NOVA will continue the series of X-ray laser experiments begun on NOVETTE. These experiments will investigate key X-ray laser phenomena.

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NOVA OPERATIONS COMPARED TO NOVETTE

Question: What level of operation will the FY 1985 budget provide for the NOVA facility compared to NOVETTE operations in FY 1983 and FY 1984?

Answer: The FY 1985 budget is adequate for single-shift operation of the NOVA facility, allowing a utilization rate of approximately five experiments per week. The FY 1983 and FY 1984 budgets were adequate to support double-shift operation of the NOVETTE laser, allowing a nominal utilization rate of 8-10 experiments per week. Because NOVA is significantly larger and more complex than NOVETTE, its operational cost is expected to be approximately two to three times that of NOVETTE.

BATTLEFIELD WEAPONS

Question: The new warhead for the 8-inch artillery projectile is being produced and the President has ordered their storage in the United States. When do you expect the new warhead, W79, to be deployed in Europe to counter the Soviet threat?

Answer: The decision to produce enhanced radiation warheads included guidance that such warheads would not be deployed without prior consultations with our Allies and then only after Presidential approval.

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Question: When will the *DELETED* warhead, W33, be replaced or retired so that the special nuclear materials can be reused?

Answer: Retirement of part of the W33 warhead stockpile is already underway. We *DELETED* *DELETED* are planning for the reuse of the special nuclear materials to support new production.

Question: Is retirement of the older W33's which are in Europe contingent upon deployment of the W79?

Answer: Historically, nuclear-capable systems have been withdrawn from Europe as replacement capabilities (conventional, nuclear, or dual-capable) are deployed. Accordingly, we would expect W33 retirement scheduling to be influenced by various considerations, including the availability of the W79 (whether forward deployed or in CONUS).

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SENTRY SYSTEM

Question: Please describe the new schedule for development of the Sentry LoAD system warhead.

Answer: The development of Sentry, the endoatmospheric interceptor that succeeded the Low Altitude Defense System (LoAD) interceptor, was terminated in February 1983.

Question: How much is requested in FY 1985 for the Sentry program? How will it be utilized?

Answer: No funds have been designated in the FY 1985 budget for Sentry.

STRATEGIC WEAPONS

Question: How much is included in the FY 1985 request for "Midgetman" warhead concept?

Answer: The Department of Energy will be conducting conceptual and feasibility studies related to the "Midgetman" (Small ICBM) warhead. Because this system concept is in the earliest stages of development, the FY 1985 budget does not include funds specifically identified for it.

Question: Explain the need for the increase in Trident II operating expenses. Provide a status report on the program including a description of the warhead design. Is there a final selection of the specific warhead design?

Answer: The Trident II operating expenses show a normal spending profile to accomplish the planned program and meet identified milestones. The increase in funding is required to continue the procurement of long leadtime items and initiate development engineering activities. The Trident II program is currently in the first year of engineering development and proceeding toward an initial operational capability of December 1989. The Department of Energy has assigned development responsibility of the warhead to the Los Alamos National Laboratory and the Sandia National Laboratories.

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Activities are now underway to weaponize this design to the Trident II warhead requirements.

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STANDARD MISSILE-2

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Question: Provide a breakdown of all funding requested in FY 1985 for this warhead.

Answer: The funding requested in FY 1985 to support the W81 warhead for the Standard Missile-2 includes $10.3 million in direct research, development, and testing operating expenses;

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and $9.0 million in production and surveillance construction.

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WEAPONS ACTIVITIES

ANTISUBMARINE WARFARE/STANDOFF WEAPON

Question: What is the status of the Department of Defense approval for the antisubmarine warfare/standoff weapon?

Answer: The Defense Systems Acquisition Review Council I, on December 1, 1982, approved the development and validation phase for the antisubmarine warfare/standoff weapon. The Defense Systems Acquisition Review Council II is scheduled for September 1985. To the Department of Energy's knowledge, the antisubmarine warfare/standoff weapon is fully funded through the engineering development phase.

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WEAPON RETIREMENTS

Question: Comment on the importance of retired weapons as a source of special nuclear material, and explain the significant reduction in weapon retirements in FY 1985.

Answer: The nuclear material reclaimed from retired weapons provides *DELETED* material used in building the new weapons entering the stockpile. However, since 1964, all the enriched uranium used in building new warheads has come from retired weapons and existing inventories.

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COMBINED DEVICE ASSEMBLY FACILITY

Question: Describe the benefits and alternatives considered to Project 85-D-105, Combined Device Assembly facility.

Answer: The benefits are that operations at the new facility will provide improved security, improved nuclear safety, and improved operations. The improved security is derived from the more favorable terrain, the better equipment for delay and detection, and other factors. A more efficient use of forces for security and the co-use of favorable terrain is planned at the new facility. Gravel-gertie type plutonium-containment structures will be built to provide improved nuclear safety. Security and operations will be enhanced overall since the facility is closer to the working points and further from the Nevada Test Site borders.

Alternatives considered were upgrading the existing sites as they separately exist and maintaining the current facilities, or to combine the two assembly activities at one upgraded existing site

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The existing facilities also cannot be modified to meet Department of Energy safety requirements.

HARDENED RADIOGRAPHY FACILITY, LAWRENCE LIVERMORE NATIONAL LABORATORY

Question: Explain the need for Project 85-D-106, Hardened Radiography Facility.

Answer: This project will replace an obsolete and unhardened facility

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is required in order to carry out high energy radiography tests involving high explosives and special nuclear materials in support of the weapons program's long-term goals at Lawrence Livermore National Laboratory. The new hardened facility will incorporate detection systems and will be capable of handling full warhead assemblies before and after dynamic and thermal testing.

Question: Explain briefly the need for the potential military capability and the amount requested for each of the Phase 1 and Phase 2 systems being proposed.

Answer: The Department of Energy receives statements of requirements for nuclear warheads from the Department of Defense. There are currently three candidate weapon systems expected to be in Phase 1 and Phase 2 in FY 1985.

The current antisubmarine warfare nuclear weapons were introduced in the Navy during the early- to mid-1960's *DELETED* *DELETED* The faster, deeper-diving, less vulnerable submarines of the Soviet fleet dictate the Navy requirements for these antisubmarine warfare weapon replacements.

- o The antisubmarine warfare/standoff weapon is being developed to replace the aging submarine-launched SUBROC missile system.
- o The antisubmarine warfare/vertical launch ASROC is being developed to replace the ship-launched ASROC missile system.
- o The antisubmarine warfare/nuclear depth bomb is being studied to provide a replacement for the air-dropped B57 depth bomb.

The small intercontinental ballistic missile (SICBM) is being developed to provide a survivable, weapon system to strengthen our ICBM part of the Triad.

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The Department of Energy is studying nuclear weapons for Ballistic Missile Defense

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The Department of Energy does not accumulate costs by specific weapon system until that system enters Phase 3, full-scale engineering development. Activities carried on prior to a system entering Phase 3 are typically more general in nature. They involve conceptual and feasibility studies related to various design options required for meeting evolving military requirements.

Phase 3 status implies a firmly stated military requirement for a weapon with specific characteristics. Many weapon concepts or ideas begin in the conceptual stage but never reach Phase 3 status. Given the preliminary nature of these conceptual and feasibility studies, we do not track costs by specific weapon candidates before Phase 3.

L Reactor Restart

Question: What is the current status of the effort to restart L Reactor at Savannah River? When will restart occur?

Answer: L Reactor has been upgraded to a status equivalent to the three operating reactors, and startup was originally planned for October 1983. Public Law 98-50 and the judgment in the lawsuit concerning the L Reactor restart required preparation of an Environmental Impact Statement (EIS) prior to restart. The draft EIS was issued in September 1983, and the final EIS is expected in April 1984. The Department is currently conducting negotiations with the State of South Carolina for a cooling water discharge permit for L Reactor in accordance with the Clean Water Act. Currently, the construction of a 1,000 acre cooling lake prior to restart is being considered by the Department as the preferred alternative to meet the thermal mitigation required to obtain the permit. The schedule for restart will be determined following publication of the Record of Decision in May 1984. However, we hope to be able to restart the reactor about the end of calendar year 1984.

Question: How much is included in the FY 84 and FY 85 budget for operations of L Reactor?

Answer: The funding for L Reactor is $64 million in FY 1984 and $65 million in FY 1985.

Question: How much is the monthly savings for L Reactor during nonoperating status in FY 1984 and in FY 1985?

Answer: Although approximately $2 million will be saved for every month L Reactor does not operate, this savings will be needed to support thermal mitigation activities for L Reactor, including a 1,000 acre cooling lake, required to obtain a cooling water discharge permit from the State of South Carolina under the Clean Water Act; the cleanup of seepage basins on the Savannah River Plant; comprehensive cooling water studies on the impacts of all Savannah River Plant operations; and other environmental programs including the decommissioning of toxic waste sites.

Question: Explain how the full amount allocated in FY 84 is being utilized. Please provide a breakdown for the record.

Answer: Funding of $40 million in FY 1984 is required by Savannah River to keep L Reactor in a ready-to-operate status. Major components of this funding are $17.3 million to support 378 fulltime employees, $5.1 million for testing and laboratory support, $8.9 million for power, $2.0 million for maintenance, $4.2 million for engineering support and $2.5 million for materials, supplies, transportation and area services. The 378 fulltime employees must be retained to assure January 1, 1985, startup since rehiring, training, and certification requires in excess of 1 year.

Beyond the $40 million, funding of $12 million in FY 1984 will be required to support thermal mitigation activities for L Reactor, i.e., the proposed 1000 acre cooling lake required to obtain a cooling water discharge permit from the State of South Carolina under the Clean Water Act. The remaining $12 million in FY 1984 is required, in addition to the $30 million requested in FY 1984 Supplemental, for cleanup of seepage basins on the Savannah River Plant, comprehensive cooling water studies on the impacts of all Savannah River Plant operations; and other environmental programs including the decommissioning of toxic waste sites. No net increase in total Materials Production funding will be necessary for restart of L Reactor.

Question: What progress is being made in terminating the use of seepage basins at Savannah River and the protection of groundwater?

Answer: DOE, in consultation with the State of South Carolina and the Environmental Protection Agency, is developing a groundwater cleanup and protection plan including proper disposition of hazardous wastes. This plan will be completed shortly. The first production air stripper to clean up the groundwater in the fuel fabrication area, M Area, has been installed and is about to begin operation. The design of the M Area waste water treatment facilities is being completed and has been coordinated with the State. Basic data required for final decommissioning of the M Area seepage basin is being acquired.

Usage of the Savannah River Laboratory seepage basins has been discontinued and studies for their final decommissioning are underway. The waste contained in the chemical, metals, and pesticide pits is currently being examined, repacked and stored in an approved hazardous waste storage facility. Extensive efforts are underway to assess the other seepage basins including those in the processing areas and other identified potential sources of groundwater contamination to identify the required groundwater protection actions.

Question: Provide a detailed status report on all activities included in FY 84 and FY 85 to address the environmental concerns at Savannah River outlined in P.L. 98-181, the Supplemental Appropriations Act of 1984.

Answer: The production air-strippers for decontamination of the fuel fabrication area, M Area, groundwater will be put into operation in FY 1984. The waste water treatment facility in M Area will be operational by FY 1985 permitting phaseout of the M Area seepage basin. Final basin decommissioning will be underway in FY 1985. The plan for groundwater protection at Savannah River will be issued shortly. Design of the effluent treatment facilities for the separations areas will be near completion and the basic data required for seepage basin decommissioning will be obtained in FY 1985. Waste excavation in the chemical, metals and pesticide pits will be completed in FY 1984 and implementation of decommissioning plans for the area will begin in FY 1985. Extensive monitoring and characterization of remaining sites of potential groundwater contamination is underway in FY 1984 and necessary mitigation activities will be defined and implemented following assessment of each site.

Mark 15 Program

Question: How much is included in the FY 1985 budget for development and fabrication of the Mark 15 core including enrichment costs? Provide a detailed breakdown of all funds requested.

Answer: The FY 1985 budget request contains $113.5 million in authorization and budget authority for the Mark 15 program.

Operating expense funding of $12.4 million provides for production of Mark 15 cores at Savannah River and Oak Ridge. Switch over from Mark 16-31 production to Mark 15 production is scheduled to begin in FY 1985. If the Mark 15 program is not implemented, this funding would still be required to support development work on the Mark 22S-25 option. We would go to the Mark 22S-25 if the Mark 15 were cancelled, as it is expected to provide a DELETED increase in productivity over the current Mark 16-31. Funding would be used for assembly and charge design, development, and analyses; test assembly fabrication; and hydraulic tests and test irradiations. If neither Mark 15 nor Mark 22S-25 is funded, $6.9 million of the operating funds presently allocated to the Mark 15 would be needed to continue producing Mark 16-31 cores to keep the Savannah River reactors operating.

Project 83-D-146, Water Pollution Control, provides for denitrification of effluents, treatment of coal pile runoff, storm water collection and treatment, and ultraviolet sewage disinfection. The FY 1985 funding is needed to provide facilities to ensure compliance of Feed Materials Production Center operations with the 1972 Federal Water Pollution Control Act, as amended by the 1977 Clean Water Act. This project is required irrespective of the Mark 15 or other production reactor fuel loading programs if the FMPC is to continue to operate.

Project 83-D-180, Facility Storage Modification, provides for additions to reactor fuel fabrication facilities to store additional fuel cores and slugs, a tank farm for process chemicals, improvements to autoclave piping and valves, and modifications to uranium recovery facilities. The FY 1985 funding provides for improvements and additions to reactor fuel fabrication facilities to support increased plutonium production initiatives. The improvements and additions provided by this project will still be required regardless of which core option; Mark 15, Mark 16-31, or Mark 22S-25, is selected.

Uranium enriching funding of $90.5 million would be required only for the Mark 15, not for Mark 22S-25 or Mark 16-31.

A breakdown of funding for Mark 15 is as follows:

Nuclear Materials Production
Funding for Mark 15 Program
($ in millions)

Operating Expenses	$ 12.4
Uranium Enriching	90.5
83-D-146 Water Pollution Control, Feed Materials Production Center, OR	4.1
83-D-180 Facility Storage Modification, SR	6.5
	$113.5

Question: How much is included in the FY 1985 budget for the Mark 22S-25 reactor core including enrichment? If the Department was to pursue the development of the Mark 22S-25 reactor core rather than the Mark 15, what would be the savings in FY 1985 and FY 1984?

Answer: There is no funding included in the FY 1985 budget specifically for the Mark 22S-25 program. However, if the Mark 15 program is not supported in the FY 1985 budget, all of the $113.5 million funding identified for Mark 15, except the $90.5 million for enrichment, will be required. Uranium enriching services are required only for the Mark 15 core. The remaining $23 million would be required to support the Mark 22S-25. Even if neither Mark 15 nor Mark 22S-25 are supported, $17.5 million will be required for production of the current Mark 16-31 reactor fuel and targets.

If the Department pursued development of the Mark 22S-25 reactor core rather than the Mark 15, it would save $90.5 million associated with enrichment services only required for the Mark 15 core in FY 1985. The $5.5 million allocated to development of the Mark 15 core would be used to develop the Mark 22S-25. All other costs associated with the Mark 15 program would be required to continue production of the current Mark 16-31 cores until the Mark 22S-25 is fully developed. There would be no FY 1984 savings.

Question: DELETED

Answer: DELETED

Reactor Operations Funding

Question: Please provide a table showing reactor operations costs for FY 1983, FY 1984, and FY 1985.

Answer: A summary of reactor operations funding is as follows:

MATERIALS PRODUCTION
REACTOR OPERATIONS
(B/A in Millions)

	FY 1983	FY 1984	FY 1985
Feed Materials	$ 48.5	$ 54.9	$ 60.1
Fuel and Target Fabrication	65.7	75.6	96.2
Reactor Irradiation	204.6	340.5	386.5
Reactor Safety	12.2	13.3	14.4
Total	$331.0	$484.3	$557.2

Plutonium Uranium Extraction Facility

Question: Please provide the funding for PUREX operations in FY 1984 and FY 1985. When did PUREX go operational in FY 1984?

Answer: The PUREX facility began operations in November 1983, 5 months ahead of the scheduled April 1984 startup date. Our FY 1984 budget for PUREX operations originally included $40.6 million. This estimate was based on reactivating PUREX in April 1984. Since we reactivated PUREX, 5 months ahead of schedule, we are currently reprogramming $26.3 million from PUREX startup to PUREX operations this year. In FY 1985 we are requesting $64.8 million for PUREX operations. If we include startup costs, costs for processing the material from an oxide to a metal at Los Alamos, and the capital costs associated with the facility, the total funding for PUREX is $92.3 million in FY 1984 and $90.8 million in FY 1985.

Supporting Services

Question: In supporting services, please provide the components that make up this account by location in FY 1983, FY 1984, and FY 1985.

Answer: A summary of supporting services funding is as follows:

Nuclear Materials Production
Analysis of Supporting Services
(B/A in Millions)

Site	Activities	FY 1983	FY 1984	FY 1985
Albuquerque	Test Isotope Production Prog.	$ -	$ -	$15.0
	Safety Studies	0.5	2.8	3.7
	Miscellaneous	0.8	0.8	-
		$ 1.3	$ 3.6	$18.7

Site	Activities	FY 1983	FY 1984	FY 1985
Idaho	FAST Startup	$ 4.8	$ 6.9	$ 7.5
	Other Startup Costs	0.6	1.6	2.5
	New Production Reactor	1.5	17.5	5.0
	IFPF Restoration	4.1	4.8	0.5
	Inventories	0.7	1.8	0.8
	Conceptual Engineering	1.1	1.3	3.3
	Miscellaneous	0.2	-	-
		$13.0	$33.9	$19.6
Oak Ridge	Startup, Shutdown, Standby	$ 0.5	$ 0.8	$ 0.6
	Transportation and Shipments	0.6	0.5	0.7
	Weapons Production Support	8.4	11.6	14.2
	Process Development	0.3	0.6	0.9
	Conceptual Engineering	1.2	3.5	0.2
	Long-Range Planning	0.3	0.1	0.1
	Uranium-233 Processing	5.6	5.0	6.4
	Change in Inventories	1.6	1.2	3.0
	Miscellaneous	0.8	1.8	2.0
		$19.3	$25.1	$28.1
Richland	PUREX Startup	$52.2	$26.3	$ -
	Startup, Shutdown, Standby	3.9	1.2	3.9
	Facilities Restoration	5.4	1.5	1.3
	Process Development	1.0	1.5	2.3
	Conceptual Engineering	1.5	2.2	4.8
	Process Facility Modification	7.6	5.0	-
	Safeguards and Security	9.6	7.2	8.2
	Change in Inventories	0.2	0.9	5.3
	Nuclear Materials Management	2.0	3.8	4.6
	T Plant Operation	1.6	2.2	1.6
	Site Cleanup	0.6	-	1.5
	Tritium R&D	1.0	2.0	3.0
	Miscellaneous	7.2	-	3.4
		$95.0	$53.8	$38.9
San Francisco	Plasma Separation Process (PSP)	$ 3.0	$15.2	$11.9
	New Production Reactor	0.6	-	-
	Tritium Target Development	-	-	1.3
		$ 3.6	$15.2	$13.2
Savannah River	L Reactor Startup	$28.1	$ 0.8	$ -
	Shutdown and Standby	1.0	0.2	0.2
	Facilities Restoration	11.0	8.4	10.5
	Conceptual Engineering	8.4	11.8	19.4
	Process Development	14.2	25.2	33.3
	Long-Range Planning	0.9	1.6	1.7
	Environmental	2.6	41.3	25.8
	Safeguards and Security	2.3	21.3	2.3
	Change in Inventories	10.7	(1.7)	17.7
	Tritium R&D	4.4	6.1	10.5

Site	Activities	FY 1983	FY 1984	FY 1985
	Plasma Separation Process (PSP)	1.4	11.8	18.1
	Miscellaneous	2.6	-	-
		$87.6	$126.8	$139.5
Headquarters	Miscellaneous	$ 0.5	0.1	-
		$ 0.5	$ 0.1	$ -
Total Supporting Services		$220.3	$258.5	$258.0

Capital Equipment

Question: Why have capital equipment requirements continued to increase significantly despite a major restoration project in Materials Production?

Answer: The Restoration Project was initiated in FY 1981 to correct deterioration that had accumulated because of the lack of adequate funding to properly maintain the materials production complex over the prior decade. It was indicated when the project was initiated that increased capital equipment, general plant, and operating funding would be required in future year budgets to prevent similar backlogs from developing again.

Also, production level increases over the last several years have resulted in the need for additional capital equipment funding. Our FY 1985 capital equipment request includes funds for large new facilities, such as PUREX and FAST, which only recently started production.

L Reactor Thermal Mitigation Projects

Question: Please describe the environmental projects that are planned at Savannah River to mitigate the thermal affects of L Reactor operations.

Answer: A decision on the thermal mitigation measures required for L Reactor will be made following the completion of negotiations with the State of South Carolina concerning a cooling water discharge permit for the reactor and publication of the L Reactor final Environmental Impact Statement, EIS. Although the EIS describes a large number of potential mitigation measures ranging from rubble dams to recirculating-type cooling towers, the Department is currently exploring with the State, the construction of a cooling lake of approximately 1000 acres prior to restart of the reactor. If negotiations are successful, this alternative appears to provide the minimum impact on schedule and cost while satisfying the thermal mitigation requirements under the Clean Water Act.

New Production Reactor

Question: What is the status of work on a New Production Reactor?

Answer: At present, new production reactor, NPR tasks have been initiated in four principal areas: preparation of cost estimates that are reactor concept specific and site specific, development of technology assessment and safety studies, evaluation of required support facilities, and compilation of environmental data. These studies have been initiated with the objective of compiling data and performing analyses for selection in mid-1985 of both a reactor concept and a site for future construction to be recommended by DOE to the President. This is necessary in order that the NPR issue can be considered fully during the FY 1986 budget cycle. Also, an NPR project office, staffed principally with supporting personnel from each of the candidate sites, has been established at DOE Headquarters to manage the study activities. The NPR tasks have been initiated using primarily a combination of the operating contractors at the candidate sites, temporary technical working groups including other DOE contractor personnel, and the NPR project office staff.

With regard to the need date for the NPR, additional studies are currently aimed at reducing the uncertainty concerning the useful lifetimes of the existing Savannah River reactors and the Richland N Reactor. These studies address the design features and operating requirements that could be expected to limit reactor lifetime and the types of renovations and equipment modifications that would be required for these reactors to continue to operate reliably for as long as feasible. No specific design feature has been identified as yet that would end the useful life of the Savannah River reactors. However, they will be more than 40 years old by the time an NPR could be completed and there is an increasing risk that the operational reliability of these aging facilities will be inadequate by that time. The Richland N Reactor is expected to reach the end of its useful life by the time an NPR could be completed unless extensive and very costly renovations are undertaken to eliminate the fundamental design problem of irradiation-induced swelling of the graphite moderator. Additionally, the feasibility of such renovations has not been demonstrated.

Although it previously has been possible to perform most of the NPR work using a combination of operating contractors at the candidate sites, temporary technical working groups, and special committees, we have reached the point where substantial additional support and expertise is required. We plan to contract for these services. Specialized support is required for assembling cost data and preparing the necessary reactor concept specific and site specific cost estimates to permit comparison of the alternatives on a uniform basis. Also, specialized additional support is required for compiling environmental impact data to permit comparison of the candidate sites on a uniform basis, performing safety analyses including risk assessments, and preparing environmental documentation such as the EIS. The total cost for these study activities will be $22.5 million, $17.5 million in FY 1984, and $5.0 million in FY 1985.

In FY 1983 we used $2.0 million to perform some preliminary site characterization studies.

Question: What is the expected TEC of such a reactor?

Answer: Estimates for the total cost of the NPR range from $3 to 6 billion based on past studies of the concepts and the sites. A cost estimate study is currently planned to provide comparable improved cost estimates that include consideration of differences in both reactor concepts and sites. This information will be prepared by a single independent contractor based on design data supplied by the concept proponents and the sites.

Question: What is the status of determining the site for a New Production Reactor and the type of reactor?

Answer: Secretary of Energy Hodel initiated the new production reactor studies in his August 9, 1983, memorandum to the Assistant Secretary for Defense Programs to develop information on alternative reactor concepts and sites. DOE is now evaluating three candidate sites: Idaho, Hanford, and Savannah River. Three candidate reactor concepts are also being evaluated: heavy water reactor, light water reactor, and high temperature gas-cooled reactor.

Studies have been initiated to provide the information needed for determining the site and reactor type including: development of cost estimates that are specific to both the reactor concept and site, preparation of reactor concept development issues studies and related safety studies, evaluation of facilities required to support the reactor concepts including differences in site specific environmental data.

Highly Enriched Uranium Requirements

Question: Please explain the requirements for enriched uranium for weapons production and the work underway in Nuclear Materials Production to provide the material.

Answer: U.S. Government needs include enriched uranium for naval reactors, nuclear materials production reactors, research and test reactors, and nuclear weapons.
DELETED
It is based on meeting requirements that are
DELETED equivalent top-product uranium
that previously was available to the weapons program. The weapons program has not obtained any enriched uranium from the uranium enrichment complex since 1964, other than for naval reactors fuel. Presently, new highly enriched uranium metal not previously in the weapons stockpile is provided from the current DOE inventory at the Oak Ridge Y-12 Plant.

Renovation of the Enriched Uranium Conversion Facility at the Oak Ridge Y-12 Plant is required to provide a capability to increase the supply of highly enriched uranium required for the Department's defense programs activities.

DELETED

Extensive refurbishment and equipment replacement will be required since the facility has been shut down since 1964. Based on recent engineering assessments, we now are able to estimate that 4 years will be required to renovate this facility for operation. Accordingly, DOE needs supplemental FY 1984 funding to initiate renovation of this facility.

DELETED

Question: Why can't this material be made available from weapons retired from the stockpile?

Answers: The projected supply of highly enriched uranium shown in the FY 1984-1989 Nuclear Weapons Stockpile Memorandum does include material from weapon systems scheduled for retirement plus the existing Y-12 Plant inventory.

DELETED

Question: What weapons in the stockpile would be the most likely candidates for retirement to fulfill the needs for enriched uranium and what would be the impact if they were to be retired?

Answer: A definitive answer to this question would require a significant joint study effort with the Department of Defense to adjust weapon system priorities

DELETED

Process Facility Modifications Project

Question: What is the status of the Process Facility Modification Project at Richland?

Answer: No funds are included in our FY 1985 budget request for the Process Facility Modification project since its near-term need is dependent on construction of a special isotope separation production facility. The Administration plans to revisit the issue of timing and need for both an SIS production facility and the Process Facility Modifications project in the FY 1986 budget. Activities planned for FY 1984 include the continuation and completion of the conceptual design effort, continuation of the process equipment development studies, initiation of the facility definitive design effort and continuation of the development of the appropriate environmental documentation.

Question: Why were no funds requested for this project in FY 1985?

Answer: The Process Facility Modifications project is being delayed 1 year consistent with the delay in consideration of a special isotope separation production facility. However, over the long term this facility would be needed to provide fuel-grade plutonium for blending even if a special isotope separation facility were not built.

Question: Would this project be required to recover plutonium even if the SIS project was to be eliminated?

Answer: In the long term, plutonium recovered in the Process Facility Modifications project could be utilized for continued blending with high-purity plutonium to increase the supply of weapon-grade plutonium. In addition, some of the recovered plutonium could be utilized as feed for the Breeder Reactor Development Program to offset future material purchases for this program.

Question: Please explain the capabilities of the Process Facility Modifications project and the Breeder Reprocessing Engineering Test facility included in the FY 1984 Nuclear Energy Budget.

Answer: A technical comparison of these two projects is as follows:

Technical Comparison PFM/BRET

	Processing Facilities Modification	Breeder Reprocessing Engineering Test
Fuel Processing	DELETED	Fuel dissolution via continuous rotary dissolvers, solvent extraction processing utilizing new process line within the existing Fuels and Materials Examination Facility (FMEF), plutonium oxide conversion utilizing new process line in existing FMEF
Waste Handling	DELETED	High level liquid waste routed to a new vitrification process
Processing Capacity	DELETED	0.1 metric tons heavy metal per day 15 metric tons heavy metal per year nominal throughput
Fuel Types Processable	DELETED	FFTF fuel Liquid Metal Fast Breeder Reactor fuels

Fuel Handling	DELETED	Truck and rail access with in-cell storage for 54 FFTF assemblies

Breeder Reprocessing Engineering Test Material

Question: Can the Breeder Reprocessing Engineering Test provide the material required for SIS separation?

Answer: Material specifications for both the Breeder Reprocessing Engineering Test, BRET, product and the SIS feed are preliminary and not well-enough defined at this time to answer this question with certainty. Preliminary indications are that both processes could be designed to make the BRET product and SIS feed compatible. However, it is our understanding that the BRET product is to be recycled and reused in the breeder reactor development program. In particular, BRET, as part of the breeder program, DELETED

Tritium R&D Program

Question: DELETED

Answer: DELETED

Stockpile Memorandum Requirements

Question: DELETED

Answer: DELETED

Uranyl Nitrate Shipments

Question: DELETED

Answer: DELETED

Contractor Employment

Question: Please provide a table showing contractor employment at the various locations supported by Nuclear Materials Production for FY 1983, FY 1984, and FY 1985.

Answer: A breakdown of contractor employment is as follows:

Nuclear Materials Production
Contractor Employment

Location	FY 1983	FY 1984	FY 1985
Albuquerque	153	307	393
Idaho	1,137	1,137	1,220
Oak Ridge	1,524	1,534	1,595
Richland	4,120	4,347	5,116
San Francisco	482	483	559
Savannah River	6,628	6,935	8,730
Total Nuclear Materials Production	14,044	14,743	17,613

STATUS OF THE WIPP PROJECT

Question: What is the status of the Waste Isolation Pilot Plant project?

Answer: The WIPP Project continues on schedule and within cost estimates. Two shafts have been constructed from the surface to the facility depth of 2,150 feet and approximately 2.5 miles of tunnels completed. A warehouse has been completed on the surface and is now being used as a temporary office building. Water storage tanks have also been completed.

Additional construction now underway includes increasing the diameter of an existing shaft to become the primary waste handling shaft and a new shaft which will be the facility exhaust shaft. Mining of the area for experiments is underway. Access roads, a railroad spur, and a water pipeline are also under construction.

Major construction still to be initiated includes the waste handling building which will be used for receiving radioactive waste and for administration space. Construction of the exhaust filter building, to filter exhaust air from storage areas will start this summer. Construction of on-site power and water distribution systems will also be started this summer.

WIPP OPERATIONS SCHEDULE

Question: WIPP construction is now scheduled for completion one year earlier than was indicated last year, and yet the operational date remains the same. Please explain.

Answer: The WIPP Project has developed its plans and schedules on the basis of actual or firm commitment data such as fixed price contracts. This data is available for the construction activities and indicates an earlier completion. Detailed planning and requirements for the necessary operational tests and check-outs, demonstrations, and pre-operational reviews and approvals have not been developed. In addition the plans for preparation, certification and shipment of TRU waste from other defense sites are based on the original operational date. Therefore, the Project has not changed its milestone of October 1988 for first receipt of waste. Activity is now underway to complete the planning and definition of requirements necessary to review or confirm that target date as soon as possible.

Question: When will you complete your latest estimate of the total estimate of cost for this project?

Answer: We expect that a final cost estimate for the WIPP Project will be available in May. By that time all important contracts will have been awarded.

INCREASED FUNDING FOR THE DEFENSE WASTE PROCESSING FACILITY

Question: Please justify the $107 million increase in costs for the Defense Waste Processing Facility, DWPF. Please explain the impact of a reduction to the increase over FY 1984 funding.

Answer: That increase ($107 million) is not an increase in the total cost of the facility. The increase above the 1984 level is necessary to keep the DWPF construction on schedule, to minimize costs, and avoid operational impacts.

The requested FY 1985 funding is slightly less than that identified for the project in last year's budget, and, because the project is going well, we have reduced the total estimated cost, TEC, from $910 million last year to $870 million this year. With the requested funding, we can take advantage of the favorable construction climate that exists and possibly further reduce costs in the construction phase of the project.

The FY 1985 funding will continue the design work to about 80 percent complete by the end of the year. It will continue construction of the main processing building and support facilities, and continue procurement of essential materials and equipment. The FY 1985 funding will also continue the testing of critical equipment and systems to insure the DWPF will operate with minimum problems. All of these efforts are necessary for operation of the DWPF in 1989 as planned.

If the funding were reduced to the FY 1984 level, it would delay the project by 9 months to one year, increase the total cost by $30 to $40 million, and cause serious operational problems at Savannah River. The Savannah River waste management program has been planned assuming that DWPF will be operational by the end of 1989. If DWPF is delayed we would have to slow down nuclear material production operations, delay the program to get waste out of the over 30 year-old tanks which could have significant safety impacts, or build new waste tanks on a crash basis. None of these options is desireable.

STATUS OF WASTE TRANSFER PROGRAM

Question: Please describe the status of the waste transfer program at Richland, Savannah River and Idaho.

Answer: There are high-level waste, HLW, transfer programs at Savannah River and Hanford to improve the safety of interim HLW storage. At Idaho, liquid waste is routinely processed to a dry granular product and stored in underground bins designed to maintain their integrity for several hundred years.

The objective of the Savannah River waste transfer program is to have all high level waste in high-integrity double-shell tanks by the end of FY 1994. There are 51 HLW tanks, specifically; 27 high-integrity double-shell tanks, 16 older "cup-and-saucer" tanks (the secondary steel liner is 5' high and the concrete encasement is full height), and 8 single-shell tanks. The HLW from one single-shell tank and one badly cracked "cup-and-saucer" has been removed. HLW will be removed from the remaining single-shell and the two other badly cracked "cup-and-saucer" tanks by the third quarter of FY 1988. The rate of completion of the

Savannah River waste transfer program is, of course, dependent on outyear funding and overall program priorities.

In the Stabilization and Isolation Program at Richland, free liquids from 149 old single-shell tanks are removed and evaporated, and the resulting concentrated liquid is stored in double-shell tanks. The single-shell tanks, containing only moist salt cake, are then isolated by sealing off any connections through which liquid could inadvertently be introduced into them. This program is scheduled to be completed in FY 1989.

FUNDING FOR NEW TANKS

Question: What new tanks are funded at each site, and what is the requirement for new tanks beyond those funded to date?

Answer: Eight new double-shell tanks, begun in 1983, are under construction at Hanford, and will be operational in April 1986. Based upon the planning assumptions in the 1983 budget, no additional tanks were expected to be required at Hanford. However, since that budget submission, additional missions have been proposed for Hanford, such as the Special Isotopes Separation facility, and extended N Reactor operations. In addition, the volume of waste produced by ongoing programs has greatly exceeded the original estimates. At this time, it is not clear how many additional tanks will be required, or when they will be needed. No additional tanks are required at Savannah River if the Defense Waste Processing Facility remains on schedule.

PROBLEMS WITH LEAKING TANKS

Question: What problems do you still encounter with leaking tanks at each site?

Answer: There have been no confirmed releases to the environment from any high-level waste tanks at Hanford within the past 3 years. However, three tanks previously suspected of leaking were confirmed as having leaked at an earlier time: Tank 110B, 200 East Area, built 1943-44, released less than 10,000 gallons containing less than 4300 curies of cesium-137, leak confirmed 1981; Tank 104TY, 200 West Area, built 1951-52, released approximately 1400 gallons containing approximately 560 curies of cesium-137, leak confirmed 1981; Tank 203B, 200 East Area, built 1943-44, released approximately 300 gallons containing a negligible quantity of cesium-137, leak confirmed 1983. When these tanks were initially suspected of leaking, they were taken out of active liquid service, the supernatant liquid was removed, and studies were started to confirm their status. There have been no leaks from any double-shell tanks at Hanford.

There have been no releases to the environment directly from any tanks at Savannah River during this time period. However, on December 29, 1983, approximately 100 gallons of HLW was released from the inlet riser of Tank 13H, a single-shell tank used as a feed tank for an evaporator. The tank has been in service since 1956 and is in the H Area tank farm. The HLW spill was detected by a radiation alarm and contained about 600 curies of radionuclides, principally cesium-137. No increased concentrations of cesium-137 were detected in the Savannah River, since most of the spill was contained through activation of the existing storm water diversion system. The high radiation level on the top of the tank has hampered access to investigate the precise cause of the leak, but temporary lead shielding has been erected and decontamination of the tank area with water and oxalic acid is proceeding as are several contamination abatement projects regarding the drainage system and treatment of the waste collected in the lined retention basin. It is estimated that total cleanup costs of the tank and the retention basin will exceed $3 million. Based on the data now available, it will probably be necessary to modify similar tanks to avoid future spills and to simplify cleanup actions if spills do occur. Recent inspections of the single-shell tanks have revealed the existence of cracks or sites at which liquids are entering some of these tanks. Monitoring has not indicated that any waste has leaked into the environment, but this possibility cannot be precluded in the future. The Department is evaluating what actions should be taken to avoid such an occurrence.

DOE WASTE INVENTORY

Question: Please describe the quantity and status of the various classes of nuclear waste at each site.

Answer: The Office of Defense Waste and Byproducts Management is responsible for the safe and environmentally acceptable management of 3 types of nuclear waste located at sites under defense program control.

Data on the specific quantities of high-level waste, HLW; transuranic waste, TRU; and low-level waste, LLW, can be best shown in the accompanying chart, which I would like to enter for the record.

DOE Waste Inventory
(thousands of cubic meters)
as of December 31, 1982

Site	Stored HLW	Stored TRU	Buried TRU	Buried LLW
Los Alamos National Laboratory	0	5.8	11.5	171.3
Sandia National Laboratory - Albuquerque	0	0	0	1.6
Hanford Site	183.0	13.4	192.2	298.1
Idaho National Engineering Lab.	11.5	47.9	57.1	121.1
Nevada Test Site	0	0.4	0	125.3
Oak Ridge National Laboratory	0	1.0	6.2	196.6
Feed Materials Production Center	0	0	0	291.0
Savannah River Plant	115.0	3.3	31.0	387.7
All other*	0	0	0	378.5
Total	309.5	71.8	298.0	1971.2

*Sites managed by other than the Office of Defense Waste and Byproducts Management, including inactive DOE sites

HLW is managed at three of our sites. Our basic strategy at all three sites is to safely store and monitor the waste pending implementation of long-term plans for waste disposal. At Savannah River, the long-term program is underway with the construction of the Defense Waste Processing Facility, DWPF, which is scheduled to begin operation in 1989. Waste in older tanks is being transferred to new, high-integrity double-shell tanks for safer interim storage. As part of the waste transfer program, the HLW at Savannah River is being prepared as feed for the DWPF.

At Hanford, liquids are being removed from the older tanks, and are being transferred to new high-integrity double-shell tanks for safer interim storage. After removal of liquid from the old tanks, the tanks are isolated from the storage system and the environment in order to preclude any possibility of inadvertent additions of waste to the tanks, and to minimize the possibility of release of waste to the environment. All fresh HLW generated from PUREX plant operation is being stored in the new tanks.

At Idaho, acidic liquid HLW is stored in high integrity stainless steel tanks. After a short period of time, the waste is routinely converted to a dry granular powder, in the New Waste Calcining Facility, then stored in underground bins. Only operational levels of liquid HLW are stored in tanks at Idaho. Essentially, the waste is calcined at approximately the same rate at which it is produced.

Transuranic waste, TRU, is managed at six of our major sites. Since 1970, TRU has been retrievably stored and monitored to assure that safe storage continues and to reaffirm the retrievability of the waste in an intact state. At all of our sites, programs are underway to certify TRU for emplacement at the Waste Isolation Pilot Plant, WIPP. The volumes do not reflect the estimated 30 percent reduction in the volume of waste which is expected to be realized when the waste is retrieved, analyzed, and sorted according to the new TRU waste concentration limits. Some TRU contaminated material was buried prior to 1970, when the TRU waste category was established. We will continue to monitor this waste in place and will take remedial actions, if necessary, to assure continued isolation of the waste from the environment.

Low-level waste, LLW, is disposed of at several of our sites. The volumes include waste at both active and inactive sites. Low-level waste is disposed of, as it is generated, by shallow-land burial in trenches. The waste burial facilities are routinely monitored and stabilized and, if so indicated, remedial actions are taken to assure the continued safety and isolation of the waste from the environment.

At all of our sites, volume reduction is a key element in our waste management strategy. Liquids are routinely concentrated by evaporation in order to reduce the potential for environmental release and to reduce the requirements for new storage facilities. With solid waste, compaction operations and improved waste generation reduction and segregation operations significantly extend the lifetime of existing storage and disposal facilities.

Verification and Control Technology

Question: Please justify the 40 percent increase in your funding from FY 1983 to FY 1985.

Answer: A major factor in the increased resource requirements associated with this program relates to the fabrication of nuclear explosion detection sensors which will be deployed on the Global Positioning System satellites. The first of these satellites will be launched in April 1984 with full deployment of the entire system to be completed in the late 1980's.

(DELETED)

Question: Please provide the funding for the various functions under Verification and Control.

Answer: In FY 1985, approximately $50.8 million or 72 percent, of the operating expenses for the Verification and Control Technology Program will be dedicated to technology activities which make important national contributions to monitoring the nuclear weapon and advance technology activities of foreign nations.

In the area of export control, the Department plans to expend approximately $2.2 million, or 3 percent, of our resources to assure that our responsibilities mandated by the Atomic Energy Act of 1954, Nuclear Non-Proliferation Act of 1978, and the Export Administration Act of 1979, are properly executed.

In FY 1985, approximately $1.8 million or approximately 3 percent of our budget will be dedicated to fulfilling arms control responsibilities.

(DELETED)

The remaining $3.8 million, or 5 percent, of our operating expenses will be dedicated toward maintaining overhead functions such as specialized communication and support services requirements.

Intelligence

Question: Please describe the coordination role of the office with regard to all intelligence gathering capabilities of the Department.

Answer: Under Executive Order 12333, U.S. Intelligence Activities, the Department of Energy has no intelligence-gathering functions (DELETED)

However, we do use intelligence gathered by other members of the Intelligence Community in our analytical efforts.

Question: (DELETED)

Answer: (DELETED)

Question: Please describe the functions of the newly created Intelligence Office in Defense Activities.

Answer: The Intelligence Office is responsible for advising the Secretary and other Departmental officials on intelligence matters and for providing the interface and coordination between the Department and the Intelligence Community. The Deputy Assistant Secretary for Intelligence serves as the DOE Senior Intelligence Officer (DELETED)
The Intelligence Office ensures that the expertise of the Department of Energy and its national laboratories is made available to the Intelligence Community. The office also ensures that the Department's intelligence requirements are articulated to the Intelligence Community so that the intelligence needs of the Department's program managers can be met.

Security Investigations

Question: Why do the number of security investigations increase by 23 percent over FY 1984?

Answer: The 23 percent increase in full-field investigations is primarily associated with the weapons program. This includes a greater number of reinvestigations for individuals in sensitive production jobs and to support several new weapons programs scheduled to start up over the next two to three years requiring buildup of program management and support personnel.

Question: How many investigations are scheduled for FY 1984 and how many were performed in the first quarter of FY 1984?

Answer: A total of approximately 27,300 investigations are scheduled for FY 1984, of which approximately 16,700 are full field. For the first quarter of FY 1984, 5,325 full-field investigations were performed.

Question: Provide an analysis of security investigations programs showing the funds for defense and for other than defense programs.

Answer: I would be happy to provide the analysis you request for the record.

Security Investigations

	Budget Authority (In Thousands)			
		FY 1984		FY 1985
Defense Activities Programs		$20,428		$23,203
Other DOE Programs		9,072		10,797
Uranium Enrichment........	5,899		6,551	
Nuclear Energy	1,015		2,076	
Other	2,158		2,170	
TOTAL		$29,500		$34,000

QUESTIONS SUBMITTED BY SENATOR DOMENICI

Special Isotope Separation Program

Question: What recent technical progress has been made in the Pu-MLIS Program?

Answer: Recent technical progress in the development of the Molecular Laser Isotope Separation (MLIS) process at the Los Alamos National Laboratory includes the following:

- The photophysics data base is virtually complete;
- DELETED of the required fuel to weapon-grade isotope separation has been demonstrated DELETED
- Improved point design parameters DELETED
- A compound for passivation and cleanup of the MLIS system has been developed; and
- A violet laser that meets all of the requirements for DELETED operation (SIS-III) has been successfully tested.

Question: What are the advantages of the Pu-MLIS process if it were fully developed to production status?

Answer: The MLIS approach to plutonium isotope separation offers several potential advantages, including the following:

- Low plutonium inventory, reducing the severity of a breech of primary containment;
- No tear-down of process components required in routine operation;
- Efficient feed utilization for small batch sizes associated with many research and development program needs;
- Am-241 separation from plutonium occurs as an intrinsic component of the PuF_6 preparation reducing the need for post process cleanup; and
- More conducive to the remote handling techniques necessary for the handling of high Pu-240 assay materials.

Question: What will SIS-III be used for following the initial process scale-up demonstration?

Answer: The Special Isotope Separation (SIS)-III is a laboratory scale facility that will demonstrate the feasibility of the MLIS process. After initial demonstration tests are completed, the SIS-III facility will be used for separating small quantities of isotopes for use in weapons research and development. This mission involves the use of highly radioactive feed and tails material. The small-scale and remote operating characteristics of SIS-III appear ideally suited for this mission. Also, should the mission be implemented, the application is projected to be economically beneficial.

Question: The Department of Transportation did not request appropriations for the upgrade of roads identified by the Department of Energy and the State of New Mexico as appropriate for such upgrade as part of the Waste Isolation Pilot Project in South Eastern New Mexico. Does the Department of Energy support the appropriation of funds for this purpose?

Answer: The Department of Energy agreed in December 1982 with the State of New Mexico to support requests for appropriations to upgrade highways in New Mexico. The Department continues to support the appropriation of funds for this purpose.

Question: Has the Department of Energy communicated this support to the Department of Transportation?

Answer: The Department has had discussions with Department of Transportation officials and has communicated this support to Congress. The attached letter to key committees was sent on July 30, 1983.

Question: The Department is presently seeking to further define the mission of the Waste Isolation Pilot Plant Project in negotiations with the State of New Mexico. It is my understanding that the Department is prohibited from disposing of high-level waste at the WIPP facility by law. Is this correct?

Answer: The Department of Energy is prohibited from permanently emplacing high-level waste in WIPP. Our mission is limited to the demonstration of transuranic waste disposal and experiments with defense high-level waste. The mission is consistent with Public Law 96-164, its Conference Report, House Report 96-702, and subsequent budget authorization legislation.

Question: Does the Department intend to do research and development on high-level waste at the WIPP facility?

Answer: The WIPP high-level waste activities are strictly limited to experiments. These experiments will contribute significantly to the state-of-the-art in radioactive waste disposal. They will also provide important information about the disposal of defense high-level waste in salt.

Question: Is it the Department's intent to remove such high-level waste from the facility prior to its closure?

Answer: The Department is committed to and is legally bound to remove the high-level waste from WIPP upon completion of the experiments.

Department of Energy
Washington, D.C. 20585

JUL 30 1983

Honorable James J. Howard
Chairman, Committee on Public
  Works and Transportation
House of Representatives
Washington, DC 20510

Dear Mr. Howard:

The Waste Isolation Pilot Plant (WIPP) is being developed as a research and development facility to demonstrate the safe disposal of radioactive waste from defense activities and programs of the United States. WIPP is located in southeast New Mexico about 25 miles east of Carlsbad. After eight years of site characterization and exploratory mining, the Department of Energy (DOE) announced its decision to proceed with permanent facility construction on July 1, 1983. A copy of our decision is enclosed.

The Department of Energy and the State of New Mexico have been working cooperatively to assure the health and safety of the citizens of New Mexico. To this end DOE has entered into specific agreements to resolve health and safety concerns raised by the State. One of their primary concerns is highway safety, and DOE is committed to assisting the State in this matter. The enclosed letter from the Secretary of Transportation to Senator Pete V. Domenici further describes the situation with WIPP and the State of New Mexico.

The State has evaluated those highways which will be used for shipping radioactive waste to WIPP. Their studies have shown that these roads are presently unsafe and substandard and that they must be repaired and upgraded. The appropriation of $5.8 million (Conference Report to accompany H.R. 3329 -- Amendment Number 30) now being considered for New Mexico is urgently needed to begin the planning and engineering for improving the radioactive waste transportation routes. DOE fully supports the needs of New Mexico and urges you to support the requested appropriation.

Thank you for your consideration and if you need additional information please let me know.

Sincerely,

Herman E. Roser

Herman E. Roser
Assistant Secretary
for Defense Programs

Enclosures

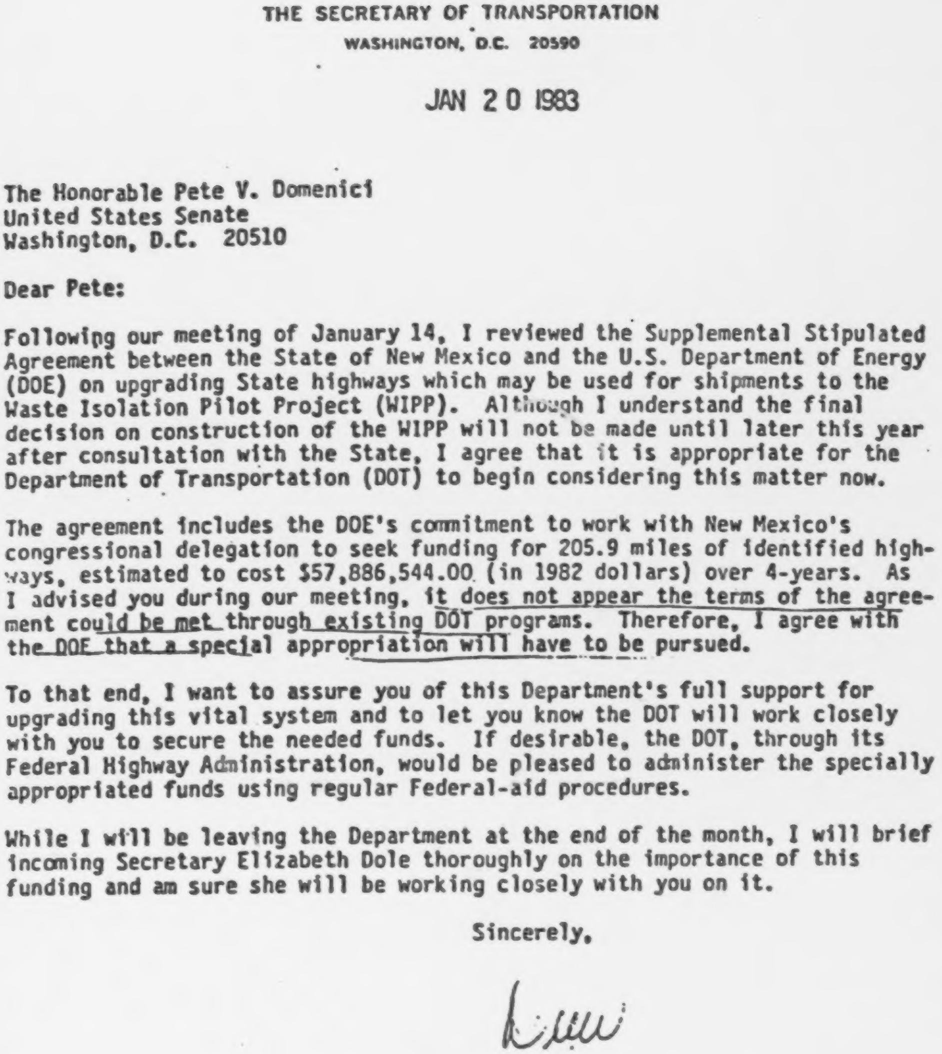
Honorable William Lehman
Chairman, Subcommittee on Transportation
Committee on Appropriations
House of Representatives
Washington, D.C. 20515

Honorable Lawrence Coughlin
Ranking Minority Member
Subcommittee on Transportation
Committee on Appropriations
House of Representatives
Washington, D.C. 20515

Honorable Samuel S. Stratton
Chairman, Subcommittee on Procurement
and Military Nuclear Systems
Committee on Armed Services
House of Representatives
Room 2115, Rayburn House Office Building
Washington, D.C. 20515

Honorable Tom Bevill
Chairman, Subcommittee on Energy
and Water Development
Committee on Appropriations
House of Representatives
Washington, D.C. 20515

Honorable James J. Howard
Chairman, Committee on Public
Works and Transportation
House of Representatives
Washington, D.C. 20510



THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

JAN 20 1983

The Honorable Pete V. Domenici
United States Senate
Washington, D.C. 20510

Dear Pete:

Following our meeting of January 14, I reviewed the Supplemental Stipulated Agreement between the State of New Mexico and the U.S. Department of Energy (DOE) on upgrading State highways which may be used for shipments to the Waste Isolation Pilot Project (WIPP). Although I understand the final decision on construction of the WIPP will not be made until later this year after consultation with the State, I agree that it is appropriate for the Department of Transportation (DOT) to begin considering this matter now.

The agreement includes the DOE's commitment to work with New Mexico's congressional delegation to seek funding for 205.9 miles of identified highways, estimated to cost $57,886,544.00 (in 1982 dollars) over 4-years. As I advised you during our meeting, it does not appear the terms of the agreement could be met through existing DOT programs. Therefore, I agree with the DOE that a special appropriation will have to be pursued.

To that end, I want to assure you of this Department's full support for upgrading this vital system and to let you know the DOT will work closely with you to secure the needed funds. If desirable, the DOT, through its Federal Highway Administration, would be pleased to administer the specially appropriated funds using regular Federal-aid procedures.

While I will be leaving the Department at the end of the month, I will brief incoming Secretary Elizabeth Dole thoroughly on the importance of this funding and am sure she will be working closely with you on it.

Sincerely,

Drew

SUBCOMMITTEE RECESS

Senator ABDNOR. We're going to adjourn this committee until 2 p.m. tomorrow when the Bonneville Power Administration will be here. Thank you all very much.

[Whereupon, at 11:35 a.m. Tuesday, March 27, the subcommittee was recessed to reconvene at 2 p.m. Wednesday, March 28.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1985

WEDNESDAY, MARCH 28, 1984

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 2:15 p.m. in room SD–192, Dirksen Senate Office Building, Hon. Mark O. Hatfield, chairman, presiding.

Present: Senators Hatfield and Sasser.

DEPARTMENT OF ENERGY

FEDERAL POWER MARKETING ADMINISTRATIONS

BONNEVILLE POWER ADMINISTRATION

STATEMENT OF PETER T. JOHNSON, ADMINISTRATOR

ACCOMPANIED BY:
- STEVEN HICKOK, ASSISTANT ADMINISTRATOR FOR CONSERVATION
- STEPHEN AILSHIE, ASSISTANT ADMINISTRATOR FOR FINANCIAL MANAGEMENT

Chairman HATFIELD. The hearing will come to order. This afternoon we will receive testimony on the 1985 budget request for the Bonneville Power Administration. As you know, our earlier hearing had been canceled. Rather than requiring all the power marketing administrations to return to Washington, we asked each of them to submit written testimony and to respond to some questions for the record.

Without objection, that material will be made part of the hearing record following the testimony of the Bonneville Power Administration.

PREPARED STATEMENT

Our principal witness today is Peter T. Johnson, Administrator of Bonneville Power. I extend a warm welcome to you and look forward to your testimony, Mr. Johnson. We will include your full statement in the record and you may proceed to summarize or to highlight your testimony at this time.

[The statement follows:]

STATEMENT OF PETER T. JOHNSON

We are pleased to present to you today the fiscal year 1985 budget of the Bonneville Power Administration.

FISCAL SUMMARY

Total program obligations are projected to be about $2.9 million, and our borrowing requirements are estimated to be about $300 million. In the documents before you, you will find a detailed description of items contained in the budget. I'd like to take this opportunity to present to you a broad view of the events and activities behind those numbers.

The 1985 budget reflects what I believe to be a major turning point in the affairs of BPA and the Northwest electric utility industry as a whole. As you know, BPA and its utility customers have been struggling through a very long and severe economic winter. That winter is ending.

We can see signs of renewal in virtually every phase of our operations. Because we have worked hard over the past several years to preserve and strengthen our fiscal integrity, we are well prepared to take advantage of the new opportunities to assist in the economic recovery of our region and the nation. I will briefly discuss the positive trends we currently see, and identify a couple of major issues rising before us in coming months.

ECONOMY

A thaw is clearly evident in the Northwest's economy. Until recently, economic recovery in our service area had been sluggish, and this has affected power sales. But in the first quarter of this fiscal year, our revenue was right on target with projections. So far in the second quarter, sales are holding up well and we hope to finish the first half of the year in a very solid fiscal position.

REPAYMENT

Two years ago, I stated that we would make full repayment of deferred interest on Treasury borrowings, plus a sizeable amortization payment, by the end of fiscal 1985. Slack power sales slowed our progress initially. However, we did not abandon our repayment goals, and they are reflected in the rates adopted late last year. Those rates will carry us into 1985, and early results give us good reason for optimism that we will meet our goals. Again, this is a very positive sign--the most encouraging sign of recovery that I have seen since becoming Administrator.

Another area in which I see positive signs is BPA's internal management. In my previous appearances before you, I stressed the themes of sound business principles, fiscal responsibility, and good planning. Our strategic planning process has produced a concept we call "best value." The best-value concept challenges managers to conduct their affairs as if a tough competitor were seeking to capture a greater share of the business.

ADP

Efforts to bring a new computer on line demonstrate the best value concept. We are developing a comprehensive financial management information system. Our new IBM 308 ID computer is enabling us to achieve greater efficiency by bringing management recordkeeping and financial information into a single data system. As this budget shows, BPA has become a $2.9-billion/year operation. That's nearly six times our gross revenue just 6 years ago. Efficient, up-to-date information management is a necessity.

SUPPLY SYSTEM

I see signs of renewal even in one of the most intractable situations I personally have encountered in 30 years as a businessman. A few weeks ago, Washington Public Power Supply System Project No. 2 entered its pre-operational testing period. No. 2 was the plant most beset with all the problems: strikes, regulatory halts, contractor difficulties. When I arrived at BPA in the spring of 1981, Project 2, the flagship of the Supply System's enterprise, was adrift.

It was obvious to me that No. 2 was not getting the attention it needed, and equally clear that the fates of Projects 1 and 3 hung on successful completion of No. 2.

The preservation of Projects 1 and 3 has had the effect of channeling the Supply System's best talent and maximum effort on completion of No. 2. Today, Project No. 2 faces no apparent obstacles to licensing and operation later this year. Meanwhile, something very important is happening regarding the preserved plants; efforts are under way to find ways to reduce the costs of completion. While Project No. 1 is in a state of suspended animation, engineers and contractors are carrying out PEP, the Preservation Enhancement Program.

Under PEP, engineers are completing designs of the project before the first worker picks up a wrench to resume work at the site. In doing so, they are finding ways to reduce costs.

And, they are elminating many of the inefficiencies of the old "fast-track," design-as-you-build method.

At Project 3, another very encouraging development has occurred. Several weeks ago, the three major contractors at Satsop tendered a contractual arrangement for completion of the plant at a fixed price considerably lower than previously estimated. The PEP program and the contractors' offer, we believe, constitute breakthroughs in the nuclear industry's battle against high risks and rising costs.

NORTHWEST POWER PLANNING COUNCIL

Recent activities under the Regional Act also show great promise. Last year, the Northwest Power Planning Council produced its first Two-Year Action Plan. We reviewed the Plan thoroughly and found no obstacles to implementing 101 of the 115 specific action items recommended by the Council. We embraced the objectives of the remaining 14. However, we believed those objectives could be achieved at lower costs.

We labored cooperatively with the Council and its staff to find better ways to address the 14 items in question. We have reached substantial agreement on adjustments that achieve the same results at a fraction of the original cost. There now remain only five items where the Council is concerned that BPA's commitment of resources might not be consistent with the Plan. The Council believes more funds are needed in appliances and in the commercial, industrial, and agricultural sectors. If our analysis suggests the need for additional funding in these areas, we have agreed to consider a shift of funds from other conservation areas. In any event, our implementation of the Council's action items will require a limited redistribution of funds within our 1984 and 1985 totals for conservation. We will inform you of any significant changes which result from our mid-year review of 1984 and 1985 spending plans.

A healthy working relationship has been established between BPA and the Council. Nearly 3 years ago, we pledged that we wanted to help the Council become strong, effective and respected. Today, with its Plan completed, the panel has achieved those attributes.

INTERTIE

In several other areas, we will be making some tough calls in months ahead. We are now in the process of formulating a new Pacific Northwest-Pacific Southwest Intertie Access Policy. This policy will set the terms for future secondary power sales over the intertie.

The intertie is a great asset for both the Northwest and the Southwest. The Federal System has a surplus of power, which we expect will last through the 1980s. Other utilities in both Canada and the Pacific Northwest also have surpluses. If the intertie is managed well, sales can be made to the Pacific Southwest--sales that will benefit all parties, North and South. The Intertie Access Policy is key to a successful marketing program. After receiving extensive comments from the public, we will move ahead and adopt a new policy.

At the request of a number of Northwest utilities, BPA has taken a lead role in the effort to secure firm surplus power sales with the Southwest. We are undertaking an aggressive and coordinated effort to secure sales which can contribute importantly to the economic health of the region.

AVERAGE SYSTEM COST

Finally, we are reviewing the average system cost methodology of the power exchange program. The methodology adopted in 1981 in the wake of the Northwest Power Act simply is not working. It has turned into an administrative nightmare, with over 60 submittals being appealed to the FERC and still others to the courts. The average system costs for exchanging utilities have been far higher than anticipated. We are proposing improvements to the methodology, and are receiving public comments. We are encouraging the parties to give Bonneville their thoughts on this important subject so the best, balanced result can be achieved. We will make changes only after a thorough review of the various positions of the parties involved.

In summary, BPA and its customers are entering a period of recovery and stability. That's the message behind the numbers you see in our 1985 budget. Tight cost controls and improving conditions enable us to project an increase in obligations of only 4.1 percent. I am optimistic that electricity rates will level off in the remainder of the 1980s. This is the best news of all. Because of the very difficult actions we have taken over the past 3 years, BPA is lean and fit. With the help of this Committee, we are ready to meet the challenges ahead.

Addendum to Statement of
Peter Johnson, Administrator
Bonneville Power Administration

BPA, THE AGENCY, ITS MISSION AND PROGRAM

BPA is the Federal electric power marketing agency in the Pacific Northwest, a 300,000-square-mile service area that encompasses Oregon, Washington, Idaho, western Montana, and small portions of adjacent western states in the Columbia River drainage basin. Originally established by the Bonneville Project Act of 1937, Public Law 75-329, to transmit and market electric power generated at Bonneville Dam on the Columbia River, BPA now markets hydroelectric power from 30 Corps of Engineers and Bureau of Reclamation projects, as well as thermal energy from non-Federal generating facilities in the the region. BPA also markets and exchanges surplus electric power inter-regionally over the Pacific Northwest-Pacific Southwest (PNW-PSW) Intertie with California, and in Canada over interconnections with utilities in British Columbia.

BPA constructs, operates and maintains the Nation's largest high-voltage transmission system (13,755 circuit-miles of transmission line and 374 substations at the end of FY 1983). This permits the coordination of the Federal electric power program with the region's public and investor-owned utilities to obtain the operating economies and investment benefits of a single regionwide utility.

Public Law 93-454, the Federal Columbia River Transmission System Act of 1974 (Transmission Act), placed BPA on a self-financed basis and brought it under provisions of the Government Corporation Control Act. BPA has ongoing "revolving fund" authority to finance its operations with revenues from its power sales and to borrow funds from the Treasury to finance its capital investments.

With the passage in 1980 of Public Law 96-501, the Pacific Northwest Electric Power Planning and Conservation Act (Regional Act), BPA's role and responsibilities were greatly expanded. The Administrator is now responsible for meeting the net firm power requirements of BPA's requesting customers and has authority to invest in cost-effective, regionwide energy conservation, and to acquire generating resources to meet these requirements. Other areas in which BPA acquired new responsibilities under the Regional Act include fish and wildlife, public involvement, and energy exchanges primarily with investor-owned utilities. These exchanges spread the benefits of relatively low-cost Federal power to residential and small farm consumers of those utilities and reduce the differential between public and private power rates in the region.

FISCAL SUMMARY

For FY 1985, BPA's program will require budget obligations of $2,907,000,000, an increase of $115 million, approximately four percent, over BPA's FY 1984 program. Total outlays are estimated to be $2,972,000,000. Program financing from revenues and other receipts is estimated at $3,076,500,000, which is forecast to result in net outlays of -$104.5 million. BPA will utilize $298.7 million of its borrowing authority in FY 1985. BPA's current rates are designed to recover all current costs of the Federal Columbia River Power System to provide for payment of the full $217.6 million cumulative deferral, and to make a $226 million amortization payment in FY 1985.

FY 1985 BUDGET PROGRAM HIGHLIGHTS

BPA's budget for FY 1985 incorporates best-value planning and management into every program area. Our costs have been pared to the minimum, while increasing whenever possible the quality of service our ratepayers receive for their dollars. Between FY 1981 and 1984, BPA's budget increased more than three and a half times, due in part to new and expanded programs directly related to the Regional Act--notably, for exchange of power with investor-owned utilities, conservation, and fish and wildlife. The other large areas of increase since FY 1981 are the Supply System resource purchases and interest expense on new borrowing.

BPA's FY 1985 obligations by program are compared below with the FY 1984 program:

	FY 1984	FY 1985
	(in thousands of dollars)	
Resource Planning, Acquisition, and Oversight	1,901,885	2,044,100
Energy Conservation	159,400	166,100
System Planning, and Construction	248,400	159,130
Operating Programs	155,700	173,100
Reimbursable	50,000	50,000
Interest	168,400	202,400
Associated Project Costs	108,200	112,200
Total Programs	2,791,985	2,907,030

Resource Planning, Acquisition, and Oversight. The Regional Act directed the Administrator to supply the net firm power requirements of each requesting Pacific Northwest utility customer. In response to that directive, BPA has established the Resource Planning, Acquisition, and Oversight program. This program is composed of BPA activities which are directed toward the orderly planning, acquisition, and oversight of reliable, cost-effective, environmentally acceptable resources, including resources purchased prior to the Regional Act, which are needed to serve BPA's portion of the region's forecasted net electric load requirements. This program comprises 70 percent of BPA's FY 1985 budget, with total funding of $2,044.1 million. An increase of $142 million over FY 1984 is proposed, due to increased levels of residential energy exchanges with investor-owned utilities to provide rate relief for their residential and small farm consumers.

Power exchanges with Pacific Northwest utilities--BPA's rate relief programs under the Regional Act--are budgeted at $1,143 million in FY 1985, an increase of $217 million. Beginning in FY 1982, this program has been "ramped in" to full implementation in FY 1985, as provided by the Regional Act. BPA's direct-service industrial (DSI) customers' rates fund the net cost of the exchange during the first four years. At the request of affected parties in the region, BPA is currently re-examining the methodology it uses to determine the average system cost of the participating utilities, a key ingredient in establishing the cost of the exchange.

Net billing costs of the three Supply System nuclear plants will require $752.9 million, a decrease of nearly $69 million from the FY 1984 funding level. This decrease results from the fact that the bulk of WNP-2 construction costs and WNP-3 preservation costs will be paid in FY 1984. This budget includes over $130 million for operating costs of WNP-2, and approximately $31 million remaining preservation costs for WNP-3. The Supply System currently has funds on hand to cover the extended construction delay at WNP-1 until late 1986. Therefore, BPA's FY 1985 budget contains only debt service costs on bonds already sold for that project.

In late 1983, BPA consolidated oversight of the Supply System projects in an expanded Program Office located at the Supply System headquarters in Richland, Washington. The Program Office will be the focal point for oversight of the net-billed projects and the primary channel of communication and coordination between BPA and the Supply System. The consolidation is designed to strengthen BPA's relations with the Supply System and to better assure the full exercise of all contractual authorities. Funding for this organization is included in the Resource Oversight portion of this program.

Energy Conservation. This program provides for the assessment of the potential for conservation and the development and implementation of cost-effective measures which will reduce the loads of the customers BPA is otherwise obligated to serve with more costly generating resources.

Energy conservation is a good example of how we have been actively applying the best-value principle. Because we are in a period of surplus, we have substantially cut our spending plans for acquiring kilowatts of conservation savings, concentrating instead on gearing up programs for later use. Our current budget of $166 million will allow us to develop the capability to acquire cost-effective conservation when this surplus period ends. Nearly half of the conservation budget will fund ongoing residential programs, but at a more deliberate implementation pace.

This FY 1985 budget was developed after consultation with the Northwest Power Planning Council (Council) and other interested parties. We worked with the Council in addressing the items included in the Council's Two-Year Action Plan. There now remain only five items where the Council is concerned that BPA's commitment of resources might not be consistent with that Plan. If our analysis suggests the need for additional funding for these items, we have agreed to consider a shift of funds from other conservation areas. We will inform you of any significant redistribution of funds within our 1984 and 1985 totals for conservation.

In May 1983, BPA launched a 2-year, $20 million test project to learn more about residential conservation. This comprehensive test project will involve the weatherization of several thousand electrically heated homes in urban and rural areas of Hood River County, Oregon. BPA is working in partnership with a private utility and an electric cooperative to weatherize the homes and carefully monitor results. Much valuable information about the future role of conservation is expected to be obtained.

A year ago BPA anticipated that a significant portion of the financing for weatherization would be available from non-Treasury sources, specifically through the sale of utility revenue bonds, the principal and interest of which would be paid from BPA revenue. Subsequent developments in the bond market, and uncertainties regarding possible legislation changing the tax exempt status of such revenue bonds, have greatly reduced prospects for securing such "off-budget" financing. This budget predicts $5 million in FY 1984 and $11.6 million in FY 1985 being available from off-budget sources.

To assist us in the development of future conservation budgets, BPA has developed a public involvement forum involving roundtable discussions throughout the region on conservation planning and programing issues.

System Planning and Construction. The objective of BPA's transmission system construction program is the planning, design, and construction of a safe, reliable, efficient transmission system to enable BPA to maintain reliable, economic service to customers, provide transmission capacity for new generation, reduce transmission losses, meet load growth, and provide transmission capacity for wheeling and energy exchange.

In keeping with best value, we have continued to adjust our construction program schedules to the load situation in the region, deferring completion or cancelling projects wherever we felt they could be delayed with acceptable levels of reliability. Estimated obligations for FY 1985 are $159.1 million, compared to FY 1984 requirements of $248.4 million.

The program's highest emphasis through FY 1985 is the completion of transmission facilities between eastern Montana and eastern Washington to integrate the output of the four units of the Colstrip coal-fired generating plants.

In an effort to overcome marketing constraints imposed by the capacity of the electrical transmission intertie system between the Pacific Northwest and the Pacific Southwest, the two regions are studying several alternatives to further increase the carrying capacity of the intertie system. One option being evaluated would not involve construction of additional transmission lines, but would increase the capacity of the terminals to the existing D-C line from 2,000 MW to 3,100 MW, thereby allowing an additional 1,100 MW of energy to be transmitted over the existing line. This project appears to offer substantial economic benefits and would not economically or technically preclude further increases in intertie capacity through various construction options currently under study. A decision to proceed would have multi-year fiscal impacts on BPA's budgets the size of which would depend on the degree of non-federal participation. This FY 1985 budget has no provision for new intertie construction, although preliminary engineering funds are available in this budget for planning studies.

In addition to the terminal expansion option, three other options for increasing intertie capacity, all of which would require the construction of additional transmission lines, are also being studied. One such plan is for a third alternating-current line from the mid-Columbia hydroelectric plants to central California and possibly extending to southern California. A second set of options involves construction of a second direct current line from a terminal in Oregon to the southern California load area. A third alternative involves construction of an inland line from western Montana to California. Each of these three alternatives could provide increased capacity of from 1,500 to 2,100 megawatts. Each of them could be ready for energization in the 1990s. Inter-utility marketing studies indicate that such further improvements are economic and would be particularly attractive if they could be made quickly, and at unit costs as low as those of a D-C terminal expansion. Of course, any BPA involvement in construction of new lines would be subject to the National Environmental Policy Act and other regulatory requirements. None of these alternatives would therefore impact this FY 1985 budget.

Operating Programs. This group of activities provides for the operation and maintenance of BPA's transmission system; power management activities, including power scheduling, rate design, and the negotiation of power sales contracts; the mitigation of the adverse impacts of power operations on the fish and wildlife resources of the Columbia River and its tributaries; and funding and support for the Planning Council established by the Regional Act.

The FY 1985 requirement of $173.1 million for this program is $17.4 million above the FY 1984 funding level, primarily due to expansion of BPA's fish and wildlife responsibilities.

Implementation of the Planning Council's fish and wildlife program is funded at $27.1 million, a level three times as great as in FY 1983. An overriding emphasis in FY 1985 activities is directed toward improving survival of juvenile and adult salmon and steelhead at and between hydroelectric facilities on the Columbia River. An additional $8.2 million has been included to pay the cost of operating and maintaining the system of fish propagation facilities constructed or operated under the Mitchell Act.

Although not reflected in the budget, the Council's "water budget" will be followed in FY 1985, resulting in an annual reduction in the region's firm generating capability of up to 520 average megawatts. The water budget provides river flows at times of the year when they are needed for fish migration and are less valuable for power production. It could result in an estimated annual revenue loss to BPA of up to $58 million under average water conditions.

Funding for the Planning Council at $6.4 million (including some BPA policy and technical support) is included in this budget. During FY 1983 the Council adopted its first regionwide Northwest Conservation and Electric Power Plan and accompanying Two-Year Action Plan. BPA and the Council agreed on the vast majority of action items included in that Plan.

Operation and maintenance of BPA's vast and complex transmission system is funded at $111.2 million, just 4 percent of BPA's total budget.

Other Program Obligations. The reimbursable program, which includes funding for the acquisition of energy or the provision of services for which BPA is fully paid by benefiting entities, is budgeted at $50 million. Interest expense is funded at $202.4 million in FY 1985, an increase of $34 million over FY 1984, due to additional borrowing to fund transmission system construction and energy conservation investments. Associated project costs of $112.2 million include payments to the Treasury for operation and maintenance expenses of the Bureau of Reclamation and Corps of Engineers' Federal Columbia River Power System (FCRPS) projects and payment of interest and amortization costs of Bureau of Reclamation FCRPS projects.

CONCLUSION

FY 1983 was a "year of defense" for BPA. We faced many stubborn problems during the year, but by tackling them in a series of tough decisions, we have moved to an offensive position in FY 1984. We expect in FY 1985 that our strategic planning will continue to provide BPA with the direction and cohesion required to deal with changing conditions in the electricity market and the region. As we set objectives and strive for excellence, we apply the best-value yardstick to all our activities, so that as our mission statement dictates, BPA will continue to "assure the region an adequate, economical, reliable, efficient, and environmentally acceptable power supply."

BIOGRAPHICAL SKETCH

Peter T. Johnson was born in Boise, Idaho, in 1932. He received a bachelor's degree from Dartmouth College in 1954. The following year he was awarded a master's degree in business administration from the Amos Tuck School of Business in Dartmouth. He completed his military service as a contracting officer in the U.S. Air Force and served in the Idaho Air National Guard.

From 1957 to 1968, Mr. Johnson worked for the MacGregor Triangle Co. of Boise, a firm specializing in heavy highway and utility construction. He was elected a director and executive vice president of the company in 1964.

In 1968, he joined Trus-Joist Corp., an international firm manufacturing roof and floor structural systems. He rose to president of the firm in 1971 and chief executive officer in 1975, overseeing the operations of the company during a period of dynamic growth.

Mr. Johnson became a private business consultant in 1979. He co-chaired a governor's management task force in Idaho during 1980, seeking ways to improve the efficiency and productivity of State government. He also was a member of President Reagan's Transition Team in 1980–81.

In May 1981, Mr. Johnson was appointed Bonneville Power Administrator by the Secretary of Energy. Bonneville Power Administration is an arm of the U.S. Department of Energy.

As Administrator, Mr. Johnson is responsible for overseeing all activities of the Federal power marketing agency, including operation of one of the world's largest high-voltage transmission systems. He directs the making of policy for BPA and guides Bonneville's effort to implement the Pacific Northwest Electric Power Planning and Conservation Act.

The Administrator is ultimately responsible for decisions on the acquisition of cost-effective power resources by BPA to serve the needs of the region. The act gave BPA the mandate to acquire electric resources, giving conservation and renewable resources priority over conventional generating resources.

He serves on the U.S. Committee of the World Energy Conference, the board of directors of the Electric Power Research Institute, the program committee of the Pacific Northwest River Basins Commission, and is chairman of the United States entity under the Columbia River Treaty with Canada.

PROGRAM OVERVIEW

Mr. JOHNSON. Thank you, Mr. Chairman. The total program obligations for Bonneville are projected to be about $2.9 billion for fiscal year 1985, and our borrowing requirements are estimated at roughly $300 million. I believe this 1985 budget reflects a very major turning point in the affairs of Bonneville and the Northwest electric utility industry as a whole.

I will briefly describe some of the positive trends I see as the Administrator and a couple of major issues that may arise in the coming months.

First, with respect to the economy: In the first 5 months of fiscal year 1984, our revenue projections are above target by approximately $20 million. Our expenditure projections are underrunning by approximately $40 million. Thus, we are net to the good something in the range of $60 million at this time versus where we thought we would be at this time in this fiscal year.

I feel very good about this because many tough money decisions by Bonneville have enabled us to keep costs down and also to keep rates down.

REPAYMENT STATUS

Two years ago, I stated we would make full repayment of the deferred interest on our Treasury borrowings, plus a sizable amortization payment by the end of the fiscal year 1985. We are on track with respect to that commitment we made to the Congress for fiscal years 1984 and 1985.

We will make about $440 million in payments to amortize Federal debt and repay the deferral previously accumulated. We are on track and I see nothing at this time that would cause us to not remain on track with respect to those obligations.

ADP REQUIREMENTS

One of the most important agency projects since I became Administrator has been the development of a comprehensive financial management information system. In connection with that, our new IBM 308 ID computer will enable us to achieve greater efficiency by bringing management recordkeeping and financial information into a single data system. I feel very good about the progress in that endeavor.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

Let me speak for a moment to the supply system. A few weeks ago, the Washington Public Power Supply System unit No. 2 entered its preoperational testing period. Today, unit No. 2 faces no apparent obstacles to licensing and operation later this year.

It was 2 years ago that I explained one of the reasons for slowing down construction of unit No. 1 was simply to put emphasis on unit No. 2. At that time, unit 2 was a troubled plant. Concentrating resources on it would make certain that we, in fact, could meet the schedule and budget limits that we were relying upon to bring that unit up to serve the region's needs.

In addition to unit 2, which is well along the path to becoming a successful generating resource, we have instituted a preservation enhancement program with respect to units No. 1 and 3. These units are now in a preserved state. With this enhancement program we use the time we have to turn circumstances to our advantage by doing design work through completion, discussing with contractors the potential of reducing the total costs of these units, and reducing the risks to the utilities and the ratepayers.

We have made substantial progress in this regard both on units No. 1 and No. 3.

NORTHWEST POWER PLANNING COUNCIL

Let me speak for a moment to the Northwest Power Planning Council. Last year, the planning council produced its first 2-year action plan. We reviewed that plan thoroughly and found no obstacles to implementing 101 of the 115 action items proposed in that 2-year action plan. The remaining 14 we agreed to in terms of their objectives, but we had difficulties with respect to cost or other considerations. We committed ourselves, however, together with the council, to work cooperatively to find successful solutions to the remaining 14 items in the 2-year action plan, and we have now, I think, overcome all but perhaps one or two of those remaining issues.

A healthy working relationship exists at this time between the Bonneville Power Administration and the new council. I consider this a new order as reflected in the Northwest Power Act. We are well along in terms of the council becoming a strong, effective, and respected institution in utility affairs in the region.

PACIFIC NORTHWEST-PACIFIC SOUTHWEST INTERTIE

Let me speak for a minute to the intertie and the issues with respect to this. We are now in the process of formulating a new Pacific Northwest-Pacific Southwest Intertie access policy. We are in the early stages of development of this new policy. It will deal with the sale of firm power and secondary power to utilities outside the region.

We are offering to represent, on an agency basis, the private utilities in surplus, such as Portland General Electric and Pacific Power & Light, as well as certain other publicly owned utilities. As contemplated under the Regional Power Act, we will attempt to put together a combination of package sales that will be in the best interest, not only of Northwest ratepayers, but of Southwest ratepayers as well.

AVERAGE SYSTEM COST ISSUE

Let me speak for a moment to the average system cost issue. We are reviewing the average system cost methodology at this time. This methodology, which was adopted soon after the Regional Power Act was passed in 1981, simply is not working. We are proposing improvements to the methodology at this time, and we are receiving public comments thereon. We will make changes only after a thorough review of the various positions of the parties involved.

I want to emphasize that this is a rulemaking process, and I encourage all parties to provide their best inputs and arguments for the record, which I will review before making a final decision. I have made no final decisions on the issue at this time.

I cannot tell you at this point whether that methodology will result in increased benefits or decreased benefits to the customers of the exchanging utilities.

RATE PROVISION

There is another issue equally important to our public agency customers, and that is the so-called rate test which has come to be known as the 7(b)(2) provision of the Regional Power Act. It is equally important to our public utility customers that we give that issue the same consideration as reforming the average system cost methodology.

In summary, Mr. Chairman, Bonneville and its customers are in a period of recovery and stability. That is the message behind the numbers you see in the 1985 Bonneville budget. These have been the conditions that have also allowed us to hold our projected increase in obligations to only 4.1 percent. I am optimistic personally that electricity rates will level off in the remainder of the 1980's. This is the best news, from my standpoint, of all. Thank you.

REPAYMENT PROSPECTS

Chairman HATFIELD. Thank you very much. Mr. Johnson, last year in your testimony, we discussed at some length the repayment plan of BPA, the revenue shortfalls, the deferred payments to the U.S. Treasury. And as you have indicated, BPA hoped to eliminate or have that under control by the end of fiscal year 1985. Could you give us a summary and report on the financial situation for fiscal year 1984 and fiscal year 1985, which you have projected and what, even though the situation being as volatile as it is with energy in the Northwest, what you might project or foresee beyond 1985 in the matter of repayment?

Mr. JOHNSON. I spoke to this briefly in my opening comments and I appreciate being able to speak to it further.

I feel as the Administrator, that this is one of the most important charges I have had in the agency's affairs. I don't have to remind you, sir, that for a number of years we have been in arrears and failed to make all our interest and repayment obligations as required by the repayment methodology. These deferred interest payments had accumulated to approximately $217 million at the beginning of fiscal year 1984. We, as I indicated, have in our 1984 and 1985 rate case adequate revenues to repay the Federal Treasury $460 million, $217 million of which will go to catching up on these deferred interest payments. The remainder, which is about $225 million, will be in amortization, or principal payment on the indebtedness that is represented by the Federal Government's investment in the Federal base system.

Beyond 1985, with the controls that we now have on costs, I am optimistic that if we are responsible and tough minded in setting rates, and continue to be fiscally responsible within the agency, we will meet all our legal obligations to the U.S. Treasury.

Chairman HATFIELD. So I gather you will catch up in 1985?

Mr. JOHNSON. By the end of fiscal year 1985 we should be caught up with our deferred interest payments, and we will be current with the amortization payment as calculated by the current repayment methodology. Thus, we will be meeting all of the requirements placed upon the agency by the U.S. Treasury and by the Congress.

AVERAGE SYSTEM COST

Chairman HATFIELD. Let's shift gears for a moment. As you know, there is furor at the present time, created by the changing of the average system cost. Could you explain how you determined average systems cost?

I am sure you have heard the report, particularly from some of the IOU's. They estimate at this time with these proposed changes, it could increase rates to their customers by some 26 to 38 percent. I need not remind you that certainly would decimate exchange benefits and wipe out the retail rate reductions that were won after the passage of the Regional Power Act. I just merely want to go on record as saying that kind of change in rates, I think, would be totally unacceptable, recognizing the need to maintain a competitive industrial rate base. The DSI's, of course, are recognized and accepted by most people.

Mr. Johnson, I don't see under this particular program how it could be other than considered that we are going to put on the backs of the home and rural ratepayer that kind of additional rate requirement and at the expense of those ratepayers to try to maintain our industrial competitive base.

In addition and more specifically, can you, at this time, give us a fairly accurate projection of the scope and impact of the proposed change and why is the current methodology inadequate? I believe you indicated that the current rules were adopted in 1981, so such a short term of its implementation. Why is it necessary now to consider such changes, and if there have been abuses, which I think have been alleged as to some of the utilities, including allocation costs in their average system cost which were not allowed, doesn't Bonneville have the authority to correct that kind of action by removing those costs? There are a number of other questions but that is a beginning request to comment on that subject.

Mr. JOHNSON. Mr. Chairman, I appreciate that question, and I am prepared to go into more detail with respect to it and provide additional detail later if I fail to respond to the two questions you have given.

I would like to review this issue because I respect your concern. I have the same concern and so do others. First, it is important to recognize that under the exchange, already some $350 million in rate relief has passed back to the domestic and rural customers of the private utilities. The largest share has come back to the customers of the private utilities in the State of Oregon. I am one of those customers and I appreciate it.

Frankly, however, the system, in my judgment, has not worked well. It is an administrative nightmare. There have been 60 submittals under the methodology as constituted. Every one of those has been referred to FERC or to the courts, even those where I have used my authority to disallow what I consider terminated plant costs in some of those submittals. Nevertheless, those have been sent to FERC.

Chairman HATFIELD. Mr. Johnson, you used the term $350 million as having been passed back, and that is in a lump sum. I certainly don't challenge that, but when you look at the rate schedules, and I have before me a monthly billing comparison, residential for public entities in Washington and Oregon, and the great gap between—let's just take Seattle at $71.22 per 3,000 kilowatts, and you compare that—and the city of Seattle is an IOU——

Mr. JOHNSON. Municipally owned utility.

Chairman HATFIELD [continuing]. Then you take an IOU like PP&L in Portland and it is $141.71 per 3,000 kilowatts. I don't see where this so-called rate relief has manifested itself at the customer level.

Mr. JOHNSON. Let me take those two instances and expand on them a bit. Seattle City Light buys only 30 percent of its power from Bonneville. The rest of its power, I believe, is from its own hydro base which has very, very low costs. There is no way that the exchange program is going to change that mix. It was wholesale rate parity I think the Congress was seeking to achieve by allowing public agency customers to buy at preference rates and for private utilities to exchange at preference rates for residential customers. It was the wholesale rate parity I think the Congress was seeking through this exchange mechanism, not retail rates.

WHOLESALE RATES

Chairman HATFIELD. If I am not using the right set of statistics, then let me ask you this question. Is there a parity of wholesale price level between the publics and the IOU's?

Mr. JOHNSON. Yes.

Chairman HATFIELD. Can you supply for the record a correlation to this kind of a chart showing those rates at wholesale levels?

Mr. JOHNSON. Yes, we will develop a chart. The priority customers, which includes that 30 percent of Seattle's loads, buy at the current preference rate which is 22 mills. So, too, do Pacific Power & Light and Portland General Electric buy at 22 mills in their exchanges. So at the wholesale rate level——

Chairman HATFIELD. And I suppose it also would be helpful to have the quantity of purchase, too, by these respective distribution groups in terms of how much of their total distribution is Bonneville source and of their own private sources, independent sources.

Mr. JOHNSON. We will be happy to work with your staff, Mr. Chairman, to make sure we have information that is understandable on this complex issue and so you can see what some of these numbers represent.

Chairman HATFIELD. I have had conversations with the mayor of Portland, and it is his view the Northwest Energy Act has not removed discrimination—that is very precisely spelled out in that act—between the rural and residential consumers on the basis of the cost to those distribution agencies from Bonneville sources. I am sure he has used figures of this comparison that I have indicated here to indicate some of what he calls the continued discrimination.

If I understand you, your response is that there is no discrimination at the wholesale rate between the public distribution agencies who purchase from Bonneville and the IOU's which purchase from Bonneville.

Mr. JOHNSON. That is correct. Where the differences could flow from would be the cost of distribution and overhead. I don't know how to compare public versus private in this area, or the other costs the private utilities may have, such as terminated plant costs that they cannot exchange with Bonneville, but this may have an impact on the retail rate in Oregon or in any other State.

Chairman HATFIELD. Would turning these private IOU groups into public agencies by the lawful means that can happen—what kind of impact would that have then on these wholesale and retail ratepayer figures? If there were no IOU's and they were all public, would that differential exist that we now see in such charts?

Mr. JOHNSON. That is a complex——

Chairman HATFIELD. I am asking you to endorse a PUD program in Oregon. [Laughter.]

Mr. JOHNSON. You have put me on the spot now, Mr. Chairman.

Chairman HATFIELD. I am not really asking you to do that. I was being facetious. But comment on that, would you?

Mr. JOHNSON. Let's first say that if, for some reason, all the private utilities in Idaho, Washington, Montana, and Oregon would become public agencies in addition to existing public agencies, they would all have access to the Federal base system. Under the Regional Power Act. Bonneville cannot deny someone who is a public agency from being served. But clearly the loads that will be placed on Bonneville will become vastly greater than the resources from which we could draw. Immediately, Bonneville, with the appropriate authorities from Congress, would have to acquire much more extensive resources to be comingled with the Federal base system resources. Then the so-called 7(b) rate, which is the preference and priority firm rate, for the four-State region and all of its ratepayers would definitely be something higher, an amalgamated rate.

I don't know what we do in the meantime with the resources controlled by private utilities. Maybe that would be acquired by Bonneville to meet the new loads placed upon it by the newly formed public customers.

Chairman HATFIELD. My question, of course, would assume it would bring all the existing resources together under the same kind of aegis that we have in the Northwest Power Act. I am not sure I got a yes or no answer in terms of what kind of differential exists, or would there be a lesser or greater differential in terms of the character of the structure that distributes this power to the respective customers between the public agencies the IOU's?

Mr. JOHNSON. I don't know that things would change significantly; I really don't. We still have related distribution costs which are those costs which go beyond purchasing at wholesale and getting it out to the ultimate consumer.

We would have costs within systems, public or private, where there were costs that could not be reduced, such as terminated plant costs. I don't think the private utilities in Oregon can walk away from the scheduled costs. Those will have to be accounted for somewhere, unless the Congress were to instruct Bonneville to reimburse those.

Chairman HATFIELD. It is interesting that all the IOU's seem to have a higher figure here than any of the other entities, the public-owned entities. I am not advocating that at this point in time, but at the same time it is awfully hard to explain to people, after the Northwest Energy Act, and Senator Jackson and I had to reach a compromise in terms of cosponsorship of the act based upon a requirement I made that we remove the discriminatory rate structures that have been characteristic of the Bonneville program all these years between those ratepayers who are serviced by IOU's and those who are serviced under a preference, PUD, or public-owned agency.

Senator Jackson made a very courageous and difficult step by accepting that as part of the Northwest Energy Act. As you know, about 80 percent of his State was serviced by the public-owned type facilities, whereas the opposite is true in my State. Yet, as it trickles down to the actual ratepayer, it is hard to explain why those differentials are still so great.

AMENDING THE REGIONAL POWER ACT

I am sure it is a complex matter that doesn't resolve itself by some kind of legislative act. Do you feel there is a need, at this time, to amend the act to give you greater authority in this particular area on matters of enforcing or matters of changing the average system cost?

Mr. JOHNSON. Mr. Chairman, a number of issues have come to the front that suggest that perhaps we should revisit the Regional Power Act and make some modifications. Possibly after we have come across the threshold date of July 1985, by which time Congress was hoping we would be in a state of relative equilibrium of wholesale rates for private customers and preference customers, we should see if we have brought about what Congress envisioned in the act.

I am still optimistic about our efforts, though the final result is not going to be perfect. I am not prepared to say at this time that this particular issue is one we should revisit with respect to modifying the act. We may know more after July 1985.

Mr. Chairman, I respect what took place prior to the passage of the act. I don't have to remind you of a provision that is very important to the public agency customers regarding their rights in section 7(b)(2) of the act. That section says there will be a rate test established to see whether they would pay more than they would absent the act. I have responsibility under the law to make sure I develop the methodology, and we are proceeding accordingly at this time.

I am not sure exactly how that is going to operate once we have completed this next rate case which will go into effect in July 1985. I am optimistic that it will work well with appropriate revisions of the exchange methodology.

RATE OF INCREASE FOR INVESTOR OWNED UTILITIES

Chairman HATFIELD. Let me restate the queston. What do you foresee to be the rate of increase for the IOU's under this change of methodology? Is it going to be more than 30 percent, lower than 30 percent? Give me a ballpark, what is the range of possibilities here?

Mr. JOHNSON. That is difficult. Let me offer a couple of comments on that, may I?

Chairman HATFIELD. Can you refute the allegation that it is going to be 26 to 38 percent higher increase in rates?

Mr. JOHNSON. I do not have information available to me now. I have heard those numbers. I agree with you that is high.

Chairman HATFIELD. Those figures are on the high side?

Mr. JOHNSON. Yes.

Chairman HATFIELD. What is the low side?

Mr. JOHNSON. The first numbers I saw ranged between 15 and 20 percent at the outside, but that was on a preliminary proposal. This would be a reduction in the amount of costs allowed in the exchange. We are still at the 7(b) rate at 22 mills, but it might be a reduction in the cost allowed in the exchange.

Chairman HATFIELD. The low side would be 15 to 20 percent, or the high side would be 15 to 20 percent?

Mr. JOHNSON. That would be the high side.

Chairman HATFIELD. Not 28 to 30, but 15 to 20. What would then be the low side of that range?

Mr. JOHNSON. In some instances, with some of the private utilities, there would be no change.

Chairman HATFIELD. No change.

Mr. JOHNSON. Fifteen percent with respect to Pacific Power & Light and maybe as high as 25 percent with respect to PGE. That was preliminary information I saw.

Chairman HATFIELD. Let's translate that into another facet of this whole rate structure. What do you project will happen in the DSI area? Let's take the aluminum industry. As you know, the aluminum industry, I believe, is about 26 mills per pound of aluminum.

Mr. JOHNSON. Yes, 26.8 mills per kilowatt-hour.

Chairman HATFIELD. The world market average on production is what, 15 or 16 mills?

Mr. JOHNSON. Fifteen or sixteen.

Chairman HATFIELD. Fifteen or sixteen. Massena, N.Y., is lower than that, 11 to 13 mills.

Mr. JOHNSON. Correct.

Chairman HATFIELD. Quebec, the new concentration of government-sponsored and supported power in Quebec will probably be between 10 and 12 mills.

Mr. JOHNSON. That's correct.

ALUMINUM INDUSTRY IN THE NORTHWEST

Chairman HATFIELD. How then are we going to hold the aluminum industry in the Pacific Northwest with those kind of figures. By the way, I believe the world price now has dropped back from about a high of 73 cents per pound back down to about 65 or 66 cents.

Mr. JOHNSON. That is my understanding, too.

Chairman HATFIELD. How are we going to hold the aluminum industry in the Pacific Northwest, or would you agree with some assessments that the aluminum industry will be gone from the Northwest in the next decade? And if that industry, which is about a 90-percent user of DSI power, leaves the region——

Mr. JOHNSON. The aluminum industry consumes 30 percent of Bonneville's entire nonexchange power supply.

Chairman HATFIELD. If that scenario should work out because of what the rate structures are and cost production, world market prices in Messena, N.Y., and Quebec, and we lose all the aluminum industry in the Northwest in the next decade or less, therefore, the rate structure would have a tremendous shift and impact upon the overall system, would it not, with the loss of that much DSI?

Mr. JOHNSON. There is a very real possibility of that.

Chairman HATFIELD. What do you project in this situation that I have outlined?

Mr. JOHNSON. Senator, when the Northwest Power Act was passed, you believed there was a place for the DSI plants and the employment that they represent, 15,000 people and a $150 million a year payroll. You believed there was certainly room to serve the domestic and rural customers within the State of Oregon as well as Washington. That we could, in fact, effect the exchange. You believed the Regional Planning Council should be the guide and lead planner in securing the new power supplies. I accepted the charge as the Administrator of Bonneville to try to bring that about.

In the first instance, I found I had to hedge on costs. You know some of the actions I have taken to get costs down. If the rates had continued to increase at the rate they were increasing for Bonneville, then we would have chased a lot of industry out of the Pacific Northwest, not just the aluminum industry. We would have crippled our agricultural industry, especially our deep-pump irrigators.

That is why I took such firm action to get Bonneville's costs down. That is the only way I can get the rates down. Having taken the action we have, seeing this plateau coming, I believe that the DSI's are not going to be forced out of the Pacific Northwest. I feel that even though as they try to make decisions on plant allocations now, nevertheless, they will find it wise to leave their operations in the region. I think there are advantages to be had by industries located here within the United States over some of those other locations we were describing.

There is certainly no more low-cost power available in the continental United States. Yes, they can get attracted out by Canada, Brazil, or Australia. If we can show in the Pacific Northwest that we can responsibly control costs, and try to deal with them fairly as we do with other customer classes, I don't think we will see that exit. I would hate to see the world forces in the marketplace and economic circumstances ultimately cause some of those industries to relocate. I am not expecting that at this time. I think there is a reasonable prospect, if we bring about rate stability, that we will not face losing that industry, and I think that is important.

RATE IMPACT OF METHODOLOGY CHANGES

Chairman HATFIELD. Mr. Johnson, even if you changed the methodology, what kind of impact on rates would the DSI's expect, anymore than maybe two to three mills?

Mr. JOHNSON. I think that shows the magnitude of what we are contemplating in terms of the reformation of the methodology. It would be a very small impact. What we would do is reduce what is called the floor rate, which would be the lowest cost with the smallest rate that would be paid by the DSI's after July 1985. It is 26.8 mills right now. If it is reduced 2 or 3 mills, then it is 24 to 25. It is a signal to them we are prepared to act responsibly. As Administrator, I have to act not only private and rural customers, but also for the DSI's in terms of their own responsibilities and rights under the Regional Power Act. I have to administer it in a sound, businesslike fashion.

Chairman HATFIELD. I think I would be more assured by that analysis if all the corporate structures were worldwide in terms of averaging out their costs within the corporation. But there are some aluminum companies that are a single corporation operating only in the Northwest, and they are not able to average their costs throughout a broad range locations or plants where they have the great variation of millage and other production costs.

I assume, correct me if I am wrong, that the availability and the dependability of power in New York and Quebec will be every much as dependable as that which we have in the Northwest; is that true?

Mr. JOHNSON. I think that the actual production in those locations is vastly smaller than in the Pacific Northwest. But, yes, I would think they have dependable power, and I don't know the nature of their contracts as to price stability or predictability. I would have to believe they are astute managers and will protect their interests.

Chairman HATFIELD. You are giving rates for interruptible power into the Pacific southwestern part of the country at a far lesser rate than either DSI's or other buyers of firm power received in the Bonneville service area. Have you considered the possibility of either raising or melding firm with interruptible power over the Intertie in order to bring in more revenue to lessen the pressure on these rate changes within the region?

Mr. JOHNSON. Mr. Chairman, we are undertaking a very concerted effort at the present time to serve as an agent for all utilities in surplus, to try to put together a package sale to the Southwest, the object being to increase the revenues for the region and to mitigate rates within the region. That will probably benefit not only the preference and private customers, but the DSI's as well.

Chairman HATFIELD. Have you had any encouragement that California will pay a higher rate?

Mr. JOHNSON. Right now they seem to want to pay a lower rate. Competition is keen in that market. It has been a revelation to us, with oil prices low at the present time, that we may have to live with this transitory phenomenon. They have been very tough bargainers. As you know, they went right past the Pacific Northwest and entered into a contract with BC Hydro for between 20 and 23 mills. That is not firm power, but, nevertheless, they have been tough to bargain with.

We think with patience and perseverence that we will be able to negotiate a transaction that will be in the Northwest interest as well as the Southwest interest.

Chairman HATFIELD. I interrupted you a while ago when you were responding to the overall question. I don't think you had indicated up to that point about the reason why the methodology is being changed now after such a short time of implementation.

Mr. JOHNSON. I would like to continue that, if I might.

Chairman HATFIELD. Please.

Mr. JOHNSON. I believe that all sales made under the methodology to date are disputed and are either before FERC or before the 9th Circuit Court of Appeals.

In my judgment, it has been abused, not only in the judgments of the private utilities but, for example, it has been abused in terms of inclusion of terminated plant costs. Those are some of the disputes that are now before us. That is what has made it such a nightmare to try to administer.

Here is the way I look at the situation, Mr. Chairman. I have an obligation as the Administrator of Bonneville to 8 million ratepayers in the Pacific Northwest. It is not just the domestic and rural customers of the private utilities; it is all customers. This means running a sound fiscal program within the agency.

Do you realize the exchange now represents 33 percent of my budget, $1 billion? That is the gross amount of the exchange, although the net amount is just roughly $170 million. I am obligated now to the tune of $1 billion, which is 33 percent of my total expenditures at this time. I must control all costs of the agency; I must control the supply system costs; I must control the internal efficiency of the agency; and I certainly have responsibility to make sure those costs coming through the exchange, whether for private utilities or for public utilities, are those that meet the test of law, the Regional Power Act. I have to make sure those costs or benefits are passed back to these domestic and rural customers are prudent and that they meet the test of the law. As far as the methodology is concerned, however, my mind is open, and I assure you I am anxious for the parties to explain how the present system might be reformed or, in their judgment, can be made to work. It is not working at the present time. This present methodology could lead, in my judgment, to bad utility decisions in the future. It encourages or almost invites it. I am not saying it has already, but I think it holds the potential for leading to bad utility decisions, all of which would result in costs coming back to Bonneville and others in the States of Oregon, Montana, Idaho, and Washington.

I can assure you that at the conclusion of our process to reform the methodology that the exchange will still exist and that it will make provision for properly allowing those costs which were intended by Congress to be allowed.

At the present time, based upon our proposed methodology, which is nothing more than a discussion piece from which the parties can begin, it will result in the continuation of roughly $170 million per year in benefits passing back to the domestic and rural customers of private utilities. This is roughly—I emphasize roughly—the current level of today. The current methodology——

Chairman HATFIELD. Let me interrupt. Why do you have to do it now? I don't quite get a clear answer. Why do you have to do it now?

Mr. JOHNSON. Three reasons. First, we are coming upon the most important rate case to be filed under the Regional Power Act. That is the one that will begin in August in order for it to go into effect in July 1985. Second, there is a further 10-percent increase in the amount of power which can be exchanged as scheduled in the Regional Power Act. Reforming the methodology at this time might avoid what otherwise could be viewed as a potential rate increase.

The third factor is that floor rate, the lowest rate paid by the DSI's after 1985, must be established under the act in the year preceding July 1985. This has been interpreted to mean it has to be the rate in effect July 1984.

We have begun this rulemaking process for those three reasons in order for me to meet my obligations under the law.

AUTHORITY OF BPA IN COST ALLOCATION

Chairman HATFIELD. Did you comment yet on the part of the question that related to the authority to correct these abuses if they exist within some units in their allocating costs? Do you have that authority now, do you feel?

Mr. JOHNSON. Not as I think it should be clarified. Under the present system, public utility commissions make determinations and that is binding upon the parties. You find rate differences based on that right now. For instance, in connection with the new coal-fired plants which are not needed to meet the loads of any private utilities except, perhaps, Puget Sound Power & Light, I understand they may be allowed as useful resources in the average system cost calculations of a private utility in Oregon. And in Montana, where the plants exist, the Montana commission is saying, "No, they are not needed," and they are disallowing them.

Chairman HATFIELD. Would that be true with the new methodology as well as——

Mr. JOHNSON. We have to deal with that, Mr. Chairman, in the new methodology.

CONSERVATION ACTIVITIES

Chairman HATFIELD. Let me shift now and ask you about a thought or two on the conservation program. I have been somewhat concerned about the reduction of the level of spending for residential and other general reductions in activities related to the conservation programs. Each time I raise the question the answer is always, "We are in a period of surplus and, therefore, the call or demand is not as great as when we were projecting in shortages."

Now, at the same time in your 1985 budget request that activity relating to the building of future capability is substantially increased; is that correct?

Mr. JOHNSON. I think the division between actual acquisition of kilowatt-hour savings versus the moneys that we will be spending on the development of capability has shifted in the direction of the latter.

Chairman HATFIELD. If those trend lines, as I understand them, one of the future capabilities now tending to have a slight increase, but the conservation programs are continually going downward—explain that to me.

Mr. JOHNSON. Mr. Chairman, that is a good question, and I think we have a good response. It is one we have worked out with the Regional Planning Council. They, too, feel it is inappropriate to be acquiring conservation at a rapid pace during a period of surplus. It is not what they consider to be a prudent utility cost.

On the other hand, they feel strongly we should use the present time to develop the capability to effect the programs, so, when the opportunity presents itself, we will be able to avail ourselves of the conservation opportunities in a sound, businesslike, and expeditious fashion. We are now developing this capability through program design and testing and the Hood River project is one example with which I am sure you are familiar. When that day arrives, when we see load growth coming, we will have the opportunity to move efficiently and speedily into the acquisition of conservation as the primary resource under the Regional Power Act.

Chairman HATFIELD. I think that makes ample sense, but in that rationale I detect that you do not equate conservation as a new source of energy. It seems to me if you are using this time to calmly project and blueprint future need, there would be just as much reason to look at future need in terms of the equivalency of new source in the field of conservation as well as new capability.

Isn't conservation additional capacity?

Mr. JOHNSON. I am not sure I quite understand the question. Can I have you repeat it?

Chairman HATFIELD. The budgetary spending trend is moving upward in planning for new capacity, while, as I indicated, your conservation activities are continuing downward. I look at conservation, and we spelled it out in the Northwest Energy Act very specifically, conservation for the first time, in law, was identified as an equivalent to new source of energy.

So it seems to me when you are looking at future capacity, you ought to include conservation as an additional source, not just constructing plants; isn't that true?

Mr. JOHNSON. Yes, and that is exactly the way we see it. It is a resource, the same as a thermal plant or the same as a renewable resource. We treat it that way. We are planning to acquire it that way. The Regional Power Act requires that as the Administrator proceeds to acquire resources, he include conservation as the No. 1 priority based upon need. That need depends upon the loads placed upon the Administrator that he must meet under the law.

At such times as those loads increase or as we move out of a surplus period, then you can be sure we will be required to acquire conservation as a resource, and it will be a No. 1 priority.

PROPER EMPHASIS FOR CONSERVATION PROGRAMS

Chairman HATFIELD. The Planning Council has indicated they feel you should put a greater emphasis on commercial, industrial, and agricultural conservation programs. Obviously, they see a level of activity within the current BPA program and they view that as a lesser level than what they would like to see. Why is that? Can you comment on the difference between the BPA level and what the Planning Council has indicated should be the level?

Mr. JOHNSON. Mr. Chairman, I should have introduced Steve Hickok on my right——

Chairman HATFIELD. Who was that? [Laughter.]

Mr. JOHNSON. Steve Hickok, our chief conservation man, and Steve Ailshie on my left, our chief financial man. I had planned to draw them more into our exchange; I am going to do that now. Steve Hickok has done an outstanding job of organizing our conservation office and developing capability. He is also dealing with this issue you raise about how much are we spending on developing conservation in the commercial and industrial sectors.

Chairman HATFIELD. Will you give me a memorandum on that, Steve? [Laughter.]

Mr. HICKOK. Gladly. Let me step back a couple of steps in time. In early 1981, we thought that conservation ought to contribute about a thousand average megawatts by 1990 toward meeting what we thought would be deficits we would be facing in the mid to late 1980's. Then, when the picture changed in 1982, we recheduled that conservation powerplant.

Basically, we now see that by 1990 on the order of 500 to 600 average megawatts ought to be installed and in place and offsetting load. So we are still constructing the conservation powerplant, if you will, to continue the generating analogy. We are just constructing it on a different schedule.

We still see the need for conservation programs to make certain contributions over time toward meeting our long-term power needs, but those needs now look different to us. So it is a matter of timing.

The council's picture, both the 1988 to 1990 time frame and the long-term time frame, shows us the same picture. As a matter of fact, they recommended that we slow the weatherization powerplant down to a much slower construction schedule than we finally did. We felt we couldn't pull it down any farther and still have it be a reasonable administrative and customer service proposition for the utilities that are running the program.

So, there is a sort of a minimum construction pace below which you should shut the whole project down cold. In other words, mothball the weatherization program.

In addition to the programs that currently are developing the kilowatt-hours of savings for the long term—and those are weatherization, institutional buildings, and street and area lighting—we are also trying to develop the capability to move rapidly into the commercial and industrial and agricultural areas.

So, we have designed pilot programs that are now operating to test the mechanisms that will allow us to develop the conservation potential in those areas as well as the residential area. Residential is practically all we are doing on a large scale right now.

We agree with the council that we need to diversify our efforts; in other words, pay more attention to the nonresidential area because there is a great potential in those nonresidential areas and we know relatively little about how to get the savings out of them.

In terms of our fiscal 1985 budget, we placed a lot of attention on the commercial, industrial, and agricultural sectors. In other words, if you take the residential weatherization powerplant construction out of the picture for a minute and just look at the capability building, it is almost all going on in nonresidential areas. So we don't have any substantial disagreement with the council over how we should be proceeding in

1985, nor in our long-term picture in terms of the megawatts that we think we can get out of those different end-use sectors.

Chairman HATFIELD. If you had a magic wand in the context of what you have just given me as information, and you could wave that magic wand to have instant weatherization, would you do it?

Mr. HICKOK. At what price?

CONSERVATION RATIONALE

Chairman HATFIELD. What I am trying to get at, and I think you put your finger on it, is that Bonneville so tied to the construction of additional generation capacity that really you ought to look at an independent agency to handle conservation activities. BPA is tied to the rate structure, you are tied to the overall economics of the Bonneville Power Administration; is that correct?

You say we want to slow down weatherization because we have surplus power. Why not accelerate weatherization? The ratepayer would be saving energy. Don't we want conservation even in times of surplus?

Mr. HICKOK. It is for the same reason you wouldn't try to accelerate construction of WPPS units 1 and 3 right now. Basically, the need for the power is now in a timeframe that dictates we not do that. The Regional Act did plug conservation into a utility framework. It said treat it as a power resource. We are not doing conservation for an altruistic motive; we are doing it for a need-for-power motive.

The cost-effectiveness test says you go after the resource that is available to meet the need in the timeframe of the need at the least cost.

Chairman HATFIELD. Don't you believe there is a conservation ethic?

Mr. HICKOK. Yes, I think conservation is not only the cheapest way to go, it is widely perceived as advantageous from standpoints that are beyond the realm of the power system.

Chairman HATFIELD. We are in a time of surplus, slowing down conservation. We have all the power we need in the Northwest and can use it as we wish, so forth. That is just like the mind set we had before the oil embargo—an infinite resource in many areas, and it is not infinite.

I don't quite follow or understand why because we are in a time of surplus, this is the time we use, use, use, unless it is tied to the economics of the institution which you represent. The private power companies have done it. They led the way in weatherization; they led the way in getting people conscious of conservation. Bonneville always felt we had to push, push, push every inch of the way to get conservation a vital part of the Bonneville operation, primarily because, I guess, and I think it comes out now, you are looking at economics—you are not looking at the ethic, you are looking at economics.

I would think if you could have weatherization, instant weatherization today, I would take it, and that might increase your surplus; then you wonder where I am going to sell it, how am I going to make repayment to the Treasury, because we are looking at conservation as an economic factor and not an ethic. Am I wrong?

Mr. Hickok. No, you are not wrong. That is the nature of the cost-effectiveness test. It is an economic test.

Chairman Hatfield. I suppose we really never can spell things out precisely in law; we never can really explain total intent, but out of that Northwest Energy Act, I think Senator Jackson and I as the chief sponsor to the legislation frequently, frequently in the hearings on that legislation saw a proposition that energy, that conservation ought to be considered as a new source of energy, not only on the basis of economics which was at that time facing us as a serious problem and all these places, but primarily as an ethic, that we were trying to reverse this trend, what we identify as a throwaway, waste-it, use-it, exploit-it type of ethic in this country today to return to a conservation one.

Just because there is a quantity there, it doesn't mean we have to use it and waste it. It seems to me when we have the technology to conserve, even in a time of surplus, we have a responsibility to conserve it, even if it creates more surplus because of the ethic underlying the idea of careful utilization and not waste.

It just seems to me we have a conflict of interest when we are forced into purely the economic consideration and have to abandon the ethic of this whole conservation program. It is just a point of view, and I am not being critical except trying to be analytical of what keeps seemingly impeding our progress in the field of conservation.

I hate to think the American people can only be sold on conservation in times of shortages or because it can only appeal to their economic well-being. It surely must be some kind of appeal to the concept of a conservation ethic, and if public agencies, like Bonneville, can't give leadership on that, I guess it is kind of hopeless in terms of getting it elsewhere, although I must commend the IOU's for doing it, even though their motive was economic, their promotion was save it.

We have gone through a whole period of time where we had plenty and we waste it, then we get into shortages, then we get all excited about conservation.

That is the sermon for the day.

Senator Sasser.

Senator Sasser. Mr. Chairman, I got here late just in time for the end of your comments, but I must say, I couldn't agree more with what you just said. I don't see any reason to pursue excessive consumption if that is really not necessary. Sometimes it appears to me that just siding with economic necessities or it is more economically feasible to do so might be shortsighted in the long run.

So, if you are giving us a score and a grade on whether or not we agree with what you characterized as a sermon, Mr. Chairman, put me down for an A-plus because I find that I agree with you 100 percent.

I think we have been a country over the years that has been guilty, I think, of excessive consumption in a lot of different areas, and we paid, I think, a high penalty for that and perhaps we will pay a higher penalty in the years ahead.

So where we can conserve without unduly affecting the quality of life, I am all in favor of doing it.

I have got no questions to ask these distinguished gentlemen.

Mr. JOHNSON. Mr. Chairman——

Chairman HATFIELD. May I say, these questions were not prepared. I have gone off on my own, but this is an area of concern.

BPA'S COMMITMENT TO CONSERVATION

Mr. JOHNSON. In all deference to the private utilities who, indeed, took a lead in acquiring conservation in the Pacific Northwest, maybe because of the current economic circumstances they have had to reassess the pace of that, and I would submit now, as you are aware, they have not seen their way clear to sign our long-term conservation contracts. Some of those utilities have pulled substantially behind where we are now.

I feel very good about what Steve and his staff have done in working with the private utilities and Regional Planning Council because we have moved way out in front in terms of seizing not only the economic opportunity conservation affords, but also the ethic it represents. We are committed to that conservation ethic in a lot of things we are doing at the present time. When the model building standards are adopted by State and local governments, they will have the effect of bringing about savings for more efficient utilization of this precious resource, and we are not discouraging that development.

Chairman HATFIELD. Mr. Johnson, then as I understand it, Mr. Hickok has total free range to move ahead as rapidly as possible on the conservation program without having to consider the economics on the matter of the amount of power that you can sell or the amount of power that will be created as additional surplus?

Mr. JOHNSON. That would be one interpretation of commitment to the ethic. I come, perhaps, a step or two short of that.

Chairman HATFIELD. You are looking at the ledger again. You are going to keep him on the ledger.

Mr. JOHNSON. I have to run a sound fiscal ship.

Mr. HICKOK. I might point out that Bonneville right now does seem to be swimming against the utility tide in the region. The public utility commissioner of Oregon is openly challenging the notion that we need to continue doing conservation. A number of investor-owned utilities that were the conservation pioneers are no longer advertising their weatherization programs. We are, at this time, willing to make investments that are looking farther into the future than perhaps anyone else in the region.

We are doing things that don't pay out in less than 30 years. We are having difficulties in getting our utility partners in this business to look beyond 2 years.

So I think that absent Bonneville's conservation program, there would be a lot less going on in the conservation field in the Northwest right now, and we intend to try to keep conservation on a steady course as the first and best thing you do to meet the long-term power needs of the region. No matter what our need turns out to be, whether it is 11,000 megawatts under the council's higher load forecast or it is only 1,000 megawatts under their lower forecast, conservation is still the first contributor toward meeting those needs, and the only way we can be assured of being able to respond to that high-load growth scenario is if we rapidly develop and then put on the shelf the programs that can go after those conservation savings in areas where we are not now active. That is our insurance. That is our insurance of being able to develop the least costly response no matter what the need for power turns out to be.

So we will stay in stride with the council's current plan and will attempt to advance this program in a way that allows the Administrator to satisfy his load-serving obligations in the region at the least cost to the ratepayer.

Chairman HATFIELD. I appreciate what you say in maintaining a leadership role here. I guess to close off on this subject, there are those who believe conservation can only be promoted by shortage. There are those who believe conservation can only be promoted by price. If the price is high enough, people will conserve, or if there is a shortage, people are forced to conserve. I would like to think we could give leadership to a conservation ethic out of which people would be motivated to save and reduce consumption that is unnecessary, exploitive and wasteful because they have concern for the future and that they are not going to be bludgeoned into conservation either by price or shortage, and I visualize what is happening here, we are not giving that kind of leadership. We are still tied to either the price or to shortage.

I would just like to see conservation restored. We have lots of great resources, but there are future generations beyond this one.

PREPARED QUESTIONS SUBMITTED FOR THE RECORD

We will submit to you, Mr. Johnson, and your staff, additional questions for the record. It is always a pleasure to welcome Bonneville's consistently excellent testimony, as presented by you, Mr. Johnson, and your predecessors over the years. I think out of all of the marketing areas, the most consistently excellent testimony and responsive answers have been given by Bonneville.

With that, we will place the BPA questions in the record followed by the statements and questions for the other power marketing administrations

[The questions and answers follow:]

BONNEVILLE POWER ADMINISTRATION

QUESTIONS SUBMITTED BY SENATOR HATFIELD

FINANCIAL STATUS

Question: Will you give the Committee a status report on the financial situation for FY 1984 as well as your expectations for FY 1985?

Answer: Our operations for the first 5 months of FY 1984 have slightly exceeded our projections made in the FY 1983 rate case. We are pleased to report that revenues are currently running about two percent above projections, while expenses are running nearly four percent below projections.

During FY 1985, we expect revenues and expenses to be close to the budgeted amounts. BPA's staff will continue to work diligently in its efforts to meet BPA's FY 1985 fiscal commitments.

Question: Although the region's energy situation is extremely volatile, what do you expect to occur in the future with respect to repayment?

Answer: BPA's budget assumes that in FY 1985 we will make cash payments to the Treasury of $197.6 million for current interest, $64.2 million for deferred interest, and $225.9 million for amortization of facilities. BPA also plans to return to the Treasury $179.2 million for interest on Corps of Engineers and BPA appropriated funds, as well as $107.2 million for associated project costs in FY 1985. In total, BPA plans to transfer more than $780 million to the Treasury in FY 1985.

AVERAGE SYSTEM COST

Question: Why change the current methodology which uses the "jurisdictional approach" for including costs as allowed by state regulatory bodies?

Answer: The change in the "jurisdictional approach" was contained in BPA's proposal to address certain deficiencies in the existing methodology. BPA has encouraged comments on this, and other changes, and is now in the process of assessing the content of the comments. It is emphasized that there has been no change in the existing methodology, and none will be made unless it is determined, after careful review, that change will improve the methodology in the interests of BPA, the exchanging utilities, and the regions ratepayers. Some of the "deficiencies" referred to above, and upon which BPA has urged comment, are:

(1). Costs approved for retail ratemaking, while allowable by a particular State's regulatory commission, are not in all cases includable in the Average System Cost as defined by the Pacific Northwest Power Planning and Conservation Act. BPA cannot disaggregate those costs without appearing to challenge the State regulators. A case in point is the recent controversy over whether certain utilities' filings have included terminated plant costs prohibited under Section 5(c)(7)(C) of the Act.

(2). With the current methodology, the utilities do not have equal incentives to control exchange costs. BPA has neither the staff nor the desire to intervene and participate in every rate proceeding in the region to offset this tendency.

(3). The Administrator has an obligation to 8 million residents to run a fiscally sound program. The methodology is currently projected to cost $1 billion in FY 1985 and be a third of BPA's entire budget. BPA must control these and other costs in order to remain competitive in its pricing of power sales and at the same time encourage the exchanging utilities to maintain their rates at the lowest prudent levels.

(4). The orders of the regulatory bodies often do not contain the specific numbers necessary for an Average System Cost computation.

(5). The current methodology produces a large number of utility filings. This causes a large administrative burden for both BPA and the utilities.

Question: Why change the existing methodology approach to equity return which is return on equity as allowed by state regulatory bodies?

Answer: The argument in favor of such a change is that equity returns allowed by regulatory agencies may have indirectly compensated some participating utilities for the costs of generation facilities terminated prior to initial commercial operation. Although not necessarily inconsistent with relevant State laws, such allowances, if included in Average System Cost determinations, violate Section 5(c)(7)(C) of the Pacific Northwest Power Planning and Conservation Act.

It is not BPA's role to independently determine a rate-of-return on equity for every exchanging utility. To do so might be viewed as an attempt to circumscribe the authority of State regulators. Instead, BPA could publish a rate-of-return on equity derived from published sources and adjusted by BPA for national terminated plant costs, implicitly or explicitly part of the rate-of-return on equity component, and to reflect the reduced risk premium component of the cost of equity as a result of the Act. As reflected in our answer above, this is one of the items upon which comment has been requested.

Question: Explain the new limitation on the amount of allowable transmission expense.

Answer: BPA interpreted the term "resources" in Section 5(c)(1) of the Pacific Northwest Power Planning and Conservation Act to include only electric generating facilities and appropriate conservation measures. The Average System Cost, therefore, is intended to reflect the utility's cost of resources. The Act does not require that any transmission expenses be included in an Average System Cost determination. Since BPA's Priority Firm rate includes transmission costs, BPA proposes to allow an amount of transmission expense equal to the lesser of the utility's transmission cost in mills/kilowatthour or the transmission cost component of BPA's Priority Firm rate. Currently, transmission costs for most utilities participating in the exchange program do not exceed the transmission cost component of the Priority Firm rate. BPA's proposal is consistent with the "single utility concept", and was designed to provide a disincentive for utilities to construct unnecessary and costly transmission facilities.

Comments on this proposal are being reviewed, and alternative suggestions will be considered.

Question: In your view, could this change detrimentally affect otherwise prudent business decisions on placement of electrical plants? For example, would this unnecessarily bias utility decisions towards building plants near load centers?

Answer: The exchange program was intended to be neutral with respect to the decision-making processes of the utilities participating in the program. Nonetheless, it will have some effect on decisionmaking since any change that has an impact on the subsidy a utility receives will to some extent influence that utility's decision-making processes. However, the proposed change regarding allowable transmission cost should not unnecessarily bias utility decisions, nor is it intended to become a prevailing factor in or prejudice these decisions.

Question: Explain the need for adjustments in the treatment of income taxes.

Answer: The actual taxes paid by a utility are based on a rate of return authorized by the specific jurisdiction governing the utility. To permit a standard, consistent method for calculating taxes, BPA has proposed to use the utility's effective rate. As a consequence, the tax expense of the utility will differ from the actual taxes paid by the utility, but a uniformity of treatment will be achieved. Comments on this proposal are being received.

Question: Please respond to the criticism that the proposed change would allow BPA to take advantage of accelerated depreciation and investment tax credit provisions while ignoring a tax law requirement to normalize such benefits?

Answer: The criticism is unfounded. Normalization of those benefits is included in the proposed methodology because the effective tax rate includes deferred tax and normalized investment tax credit adjustments.

Question: Why change to using the "historical" data from the FERC Form 1 document for Average System Cost calculations?

Answer: The use of historical or actual data was proposed to achieve consistency with the uniform cost approach proposed in the Average System Cost Methodology. Utilities which do not file FERC Form 1's may use an equivalent source provided the data is prepared in accordance with the FERC Uniform System of Accounts.

Question: Please respond to the assertion that if adopted, the proposal would require investor owned utility (IOU) customers to pay on the basis of projected BPA costs, while BPA would pay the IOU's on the basis of historic costs?

Answer: The assertion is true. BPA's rates are set consistent with statutory directives which require BPA to recover certain costs and use a projected test year to determine those costs for its rates. With the proposed methodology, each IOU's compensation under the exchange would be based on its actual costs.

The purpose of the exchange, however, is to provide wholesale rate parity between residential and small farm consumers of the IOU's and public agencies. It is not the intent of the proposal to change this purpose.

SALES TO CALIFORNIA

Question: Discuss the progress being made on additional sales of firm power to California.

Answer: BPA has sent a letter to the Pacific Northwest utilities requesting a response from those wishing to participate in a regional sale of firm power to California. Following receipt of the responses, expected in April, the information will be consolidated. Meetings with the California utilities will then take place to determine if an appropriate sale can be structured and consummated.

BPA also has a number of bilateral marketing discussions in progress with the California utilities. Specifically, discussions are underway between my staff and Southern California Edison regarding a replacement for the existing Exchange Agreement which expires July 31, 1987; a 5-year arrangement which provides for the sale of surplus firm power which has a contract demand of 550 average megawatts; and a 20-year sale of capacity at a contract demand of up to 725 average megawatts with options for additional energy. These might be converted to capacity, energy exchange, or surplus firm power sales.

In addition, we are having discussions with the Los Angeles Department of Water and Power regarding a replacement of the existing Exchange Agreement and an offer of a 2-to-5-year arrangement providing for the sale of surplus firm power at a contract demand of 525 average megawatts.

Discussions with Pacific Gas and Electric Company concerning an extension of the existing arrangement for purchase of seasonal capacity at a contract demand of 600 average megawatts are also continuing. Other preliminary discussions concerning a long-term sale of capacity at a contract demand of 600 average megawatts under terms similar to those with Southern California Edison are also continuing.

INTERTIE SYSTEM

Question: Please describe the option which would increase the capacity of existing transmission lines.

Answer: The option you are referring to is the DC terminal expansion that BPA has under study and which is not included in BPA's FY 1985 Congressional Budget. This project would increase the transfer capacity of the direct-current line terminals at Celilo, Oregon, and Sylmar, California, by 1,100 average megawatts, thus allowing transmission of 3,100 average megawatts of electricity over the line between the two regions. This project would not require the construction of a new transmission line; instead, it would allow use of present unused line capacity. Our study indicates that the project, once begun, could be completed within 3 years.

Question : What is the total estimated cost, Federal share, construction schedule, and what would be the estimated increase in revenues assuming a 3-6¢/kWh price?

Answer: The DC terminal expansion projects at Celilo, Oregon, and Sylmar, California are estimated to cost in total between $200-250 million, including about $105 million for upgrading the terminal at Celilo, Oregon. Non-Federal utilities have indicated a willingness to finance the Sylmar terminal project. The Federal share would depend on the extent to which non-Federal utilities participate in the Celilo terminal project. The project could be initiated as early as 1985 if the necessary studies are completed and approvals are received. The project might then be completed and energized in 1988.

If firm sales agreements were made, it is estimated that incremental revenues to the Northwest each year would be approximately $65 million at 3¢ per kilowatthour, and twice that amount, or about $130 million a year at 6¢ per kilowatthour.

Question: What are the advantages and disadvantages of the terminal expansion option?

Answer: The terminal expansion project could increase intertie capacity 3-5 years earlier than if a new line was constructed because it would utilize the unused capacity of the existing DC Intertie line. Not only does this mean that a new line would not need to be constructed but also that an additional right-of-way would not be required. The project would not depend on the development of interregional firm power contracts but would be justified by increased surplus sales alone. However, the additional capacity would enable more Northwest energy to be sold for longer periods of time and thus enhance the marketability of firm energy which would command a higher price.

The chief disadvantage is that the terminal expansion would not increase interregional transmission reliability since a back-up transmission facility is not in existence to mitigate the impact of outages which may cause the loss of firm load. Design and operating measures would be taken, however, to minimize the occurrence and impact of these potential outages. Terminal independence and redundancy in remedial power system control have been planned.

Another perceived disadvantage of the terminal expansion would be the reduction of justification for a future high capacity line. The construction of a future line would only be undertaken after all the necessary studies are completed, the associated benefits identified, and the appropriate approvals are received.

Question: If agreement is reached on power sales to the Southwest and the terminal expansion is approved, will additional borrowing authority be needed in FY 1985? If so, how do you plan to obtain the additional funding?

Answer: If the terminal expansion was undertaken during FY 1985, after the appropriate approvals were received, and studies were completed, it could increase BPA's budget obligation of borrowing authority in FY 1985 by up to $65 million, if there were no non-Federal participation. BPA could fund its share of a terminal expansion with proceeds of Treasury borrowings authorized by the Federal Columbia River Transmission System Act, and could include the debt service on the borrowings in its revenue requirements.

A-76 STUDY

As I understand it, Bonneville has been directed by DOE to study the potential for contracting out a large number of its activities. (OMB Circular A-76)

Question: Can you comment on the scope and cost of the study?

Answer: Pursuant to Government policy, as defined in OMB Circular A-76, each agency is required to develop an inventory of its commercial activities, and to then conduct a management and cost review of each such activitiy. Toward that end, BPA, along with all other elements of the Department, was directed in a February 24, 1984, memorandum to identify, aggregate and schedule for review all of its commercial activities. The Department included a preliminary assessment of BPA's apparent commercial activities with the memorandum.

Based upon the Department's preliminary assessment, approximately 60 percent of BPA's work years in 64 BPA functional areas could be subject to review under Circular A-76. As a result of information requested by the Department and provided by BPA and other DOE elements, the Department is currently refining this preliminary commercial activities inventory assessment. This effort will be complete in the next few weeks.

Resources to perform the studies would vary depending on the size and complexity of each study, as well as the number of activities ultimately included in an agreed-upon final inventory of commercial activities. BPA estimates that conducting A-76 reviews on the Departments' entire preliminary list of BPA activities would require 75 full-time equivalents and $2.8 million annually over a three year period. Some of these amounts might be offset in future years by cost savings identified by the studies.

Question: What has BPA done in the recent past to contract for additional services?

Answer: BPA uses private sources to perform many of its activities. In addition to its existing purchase power contractual agreements, BPA currently spends over $391 million for contractual services. These functions would have required approximately 6,425 in-house FTE. A majority of the contracting is performed in the following areas: Conservation Planning, Acquisition, and Oversight; Nonelectric Power System Operation and Maintenance; ADP Operations and System Development; Fish and Wildlife; and Construction, Testing, and Energization.

BPA has several core activities that must be retained under close BPA operational and policy control. However, BPA recognizes that it has other functions that can be prudently performed with the help of the private sector. The substantial dollar and FTE amounts reflect BPA's use of contracts to perform many of its non-core functions. Based on the historical dollar amount spent during FY 1983, and spending estimates for FY 1984 and 1985, contracting with private sources has increased and continued increases are expected. In addition, BPA is continuing to evaluate its activities to identify ways to assure the region of an adequate, economical, reliable, efficient, and environmentally acceptable power supply.

FISH AND WILDLIFE ACTIVITIES

Question: Did BPA have any carryover in its FY 1983 fish and wildlife budget? FY 1982? Will BPA have any carryover in its FY 1984 budget? Please describe the reason for any carryovers.

Answer: In FY 1982 BPA budgeted $5.2 million for fish and wildlife protection, mitigation, and enhancement activities. In that year we obligated nearly $4.7 million under contract, largely to the region's fish and wildlife agencies and Indian tribes. In FY 1983, we budgeted $10.2 million and obligated over $9.1 million. We are unable to say at this time how much of the $22.1 million budgeted for FY 1984 will eventually be obligated. However, our expectation is that all or most of the available funds will be productively used. BPA does not carry over unobligated funds from one year to the next. Each year's budget is based solely on the summation of activities that reasonably can be expected to be implemented in that fiscal year.

Question: Please describe in more detail BPA's fish and widlife activities, including schedules and budgets, for FY 1985. Provide a breakdown of the operating expenses and capital investment/construction with a full description of each project including total estimated cost and obligations in each year.

Answer: The Fish and Wildlife Program level in the FY 1985 budget before you is $35.3 million. In addition, approximately $58 million in average annual revenues will be foregone due to the firm constraints on the energy generating capability to facilitate downstream passage of juvenile salmon and steelhead. The $35.3 million budgeted includes $8.2 million for the operation and maintenance of the Mitchell Act hatcheries and rearing ponds and $27.1 million to fund BPA's fish and wildlife projects in the Columbia River Basin. Specifically, BPA plans to spend approximately $2.5 million for the five major capital investment projects included in our appropriation language, and about $24.6 million for operating expenses. The operating expenses will be used for the renewal of projects we began funding in previous years or begin funding in FY 1984 and for the initiation of new projects. I have asked my staff to summarize these projects. and will forward the listing to the Committee as quickly as it can be prepared.

Of the five capital investment/construction projects in our FY 1985 appropriation language, three are located in the Yakima River Basin, Washington, the fourth project is on the Umatilla River, Oregon, and the fifth project is near Lake Pend Oreille, Idaho.

When the Planning Council adopted its Fish and Wildlife Program, it created a program section to deal specifically with Yakima River Basin enhancement. This action recognizes the significant contribution the Yakima Basin could make to Columbia

River salmon and steelhead restoration efforts, if existing fish passage problems can be overcome. BPA, in cooperation with the Bureau of Reclamation, the Bureau of Indian Affairs, the Yakima Indian Nation, the Washington Department of Ecology, various Federal and State fish and wildlife agencies, the City of Yakima, and local irrigation districts, is working to solve these passage problems. BPA's FY 1985 budget proposes approximately $1.5 million in borrowing authority and $ .3 million in revenue financing to begin design and construction of fish screens and new fish ladders at Sunnyside Dam, Wapato Diversion Dam, and the Toppenish Creek/Satus Unit Diversion, and to begin the necessary National Environmental Policy Act studies. The following chart shows funding levels by year and total costs for the three major Yakima Basin Projects. Old Reservation Canal's funding is included with Sunnyside Diversion Dam's funding.

BONNEVILLE POWER ADMINISTRATION
YAKIMA BASIN PROJECTS

	FY 1985	FY 1986	Total
	($ Thousands)		
Sunnyside Diversion Dam	$ 694	$3,710	$ 4,404
Wapato Diversion Dam	$ 747	$3,997	$ 4,744
Toppenish/Satus Unit	$ 239	$1,290	$ 1,529
Totals	$1,680	$8,997	$10,677

The proposed appropriation language would also approve design and construction activities at the Bureau of Reclamation's Three Mile Diversion Dam, located on the Umatilla River, Oregon. Three Mile Dam is an irrigation diversion dam, located three miles from the Umatilla's confluence with the Columbia River. It currently has inadequate upstream and downstream fish passage facilities, which causes significant mortality to both adult and juvenile salmon and steelhead. Construction is expected to include renovation of existing adult passage facilities, installation of new or additional passage facilities, and installation of adult collection and counting facilities. These modifications will improve upstream and downstream survival of salmon and steelhead; allow the collection and development of Umatilla River salmon and steelhead brood stock; allow the enumeration of adult salmon and steelhead using the Umatilla River; and compliment and enhance results of other BPA funded fisheries activities in the Umatilla River Basin. BPA's FY 1985 budget includes $264,000 for the design of the Three Mile Dam project. The project's estimated construction costs are expected to range between $1.5 million and $2.0 million.

Finally, BPA has included $644,000 in its FY 1985 budget to begin construction of a fish hatchery near Lake Pend Oreille, Idaho, as I mentioned earlier. The total cost to BPA is expected to be from $1.0 million to $1.2 million, and the hatchery is expected to be completed in FY 1986 or FY 1987. This hatchery is being constructed to mitigate the dual impact on Lake Pend Oreille kokanee populations of hydroelectric development and of introduction of *Mysis* shrimp into the lake, a failed management strategy. The establishment of *Mysis* shrimp was an attempt to supplement the adult kokanee's food base. This enhancement attempt by the Idaho Department of Fish and Game failed because the *Mysis* compete for the same food source as the juvenile kokanee. A significant point to make regarding this project is the cooperative nature of its development. BPA is negotiating an agreement with The Washington Water Power Company and the Idaho Department of Fish and Game, in which BPA and The Washington Water Power Company will fund hatchery design and construction and the Idaho Department of Fish and Game will operate and maintain the facility with State funds. The hatchery is expected to restore the Lake Pend Oreille kokanee fishery to a level of 744,000 harvestable adults annually, from its current level of approximately 200,000 adults.

Question: Provide an object class breakdown, in terms of various responsibilities, including the FY 1985 staffing level or FTE levels, for BPA's Fish and Wildlife Division.

Answer: BPA's FY 1985 Fish and Wildlife Division expenditures for implementing the Planning Council's Fish and Wildlife Program are captured in three object classes. The following table shows these object classes and their associated dollar levels.

BONNEVILLE POWER ADMINISTRATION
FISH AND WILDLIFE DIVISION PROGRAM LEVELS -- FY 1985

Personnel Compensation	$ 694,700
Travel and Transportation	$ 98,000
Contracts	$25,787,400
Total	$26,580,100[1/]

[1/] Does not include approximately $500,000 distributed to BPA's Fish and Wildlife Program for BPA-wide administrative and overhead expenses.

The Division of Fish and Wildlife presently has an authorized staffing level of 25 people. We expect that the Division will not exceed this level in FY 1985. This is consistent with what BPA believes is a regional desire that BPA not develop a large fish and wildlife staff that would duplicate existing capabilities within the region's fish and wildlife agencies. The Division consists of two branches: the Biological Studies Branch, which is authorized 14 full time personnel and the Systems Integration Branch which is authorized 8 personnel. The remaining three are the Division Director and his staff of two.

The Biological Studies Branch and the Systems Integration Branch each have responsibility for developing and administering contracts through which BPA implements and accomplishes the objectives of the Council's Fish and Wildlife Program. Each is also responsible for coordinating activities with the region's state and Federal fish and wildlife agencies, Indian tribes, land management agencies, utilities, and others in implementing the Columbia River Basin Fish and Wildlife Program.

There is one significant distinction in the functions of the two branches. The Biological Studies Branch contains most of the Division's biological expertise and is the major technical liaison with the fish and wildlife agencies and Tribes. The Systems Integration Branch is staffed to work with operational issues, such as the Water Budget, and related activities. In addition, the latter branch reviews and analyzes BPA's proposed policies, programs, and plans for their consistency with the Council's Fish and Wildlife Program.

We have a total of approximately $26 million available for funding in FY 1985. Of this, about $17 million will be administered by the Biological Studies Branch. Activities to be addressed include salmon and steelhead migration, habitat and passage improvements, fish culture, and wildlife mitigation.

The Systems Integration Branch will administer about $9 million of the budget. Activities toward which this money will go include studies to measure the effectiveness of the Water Budget, the development of anadromous fish goals and objectives, the Yakima River Basin Project, resident fish mitigation, and activities attendant to development of new hydroelectric facilities.

Question: How much has been allocated for contracts to protect, mitigate, and enhance fish and wildlife in FY 1985? List the contract areas and total amounts allocated to each area.

Answer: Of the $27.1 million available to fund BPA's fish and wildlife projects in the Columbia River Basin, $25.7 million will be available for fish and wildlife protection, mitigation, and enhancement contracts. Dollar obligations by contract area will depend heavily on the consultative process through which we identify specific projects to fund each year, and on the negotiations that take place as part of the procurement process. The following table details these planned expenditures.

BONNEVILLE POWER ADMINISTRATION
FISH AND WILDLIFE CONTRACT EXPENDITURES -- FY 1985

Operations and Monitoring	$ 2.4 million
Yakima Basin Passage Improvements	$ 1.8 million
Other Fish Passage Improvements	$ 1.9 million
Fish Habitat Improvement Projects	$ 6.6 million
Hatcheries and Other Facilities	$ 0.9 million
Studies, Investigations, Research, and Miscellaneous Restoration Projects	$12.1 million
Total	$25.7 million

In addition, $8.2 million is included in BPA's FY 1985 budget for the operation and maintenance of the Mitchell Act hatcheries and rearing ponds.

Question: Please describe the procurement process BPA uses to solicit proposals and fund measures to protect, mitigate and enhance fish and wildlife.

Answer: There are two parts to your question: First, the process through which a program measure is carried to a stage of development and definition that allows a procurement solicitation to be developed, and second, the solicitation of proposals and negotiation of contracts. Each of these activities involves different procedures and time commitments.

I have charged my Fish and Wildlife staff with implementation of those measures which are adequately defined, evaluated, and assessed. By this, I mean those which show a sufficient understanding of such matters as objectives, scope, design, project setting, relationship to other projects, probable methodologies, and means of measurement which enable us to examine a project for technical merit and coordination, and to develop a procurement solicitation for it. In FY 1984, BPA's staff carried out the process of developing projects to a stage ready for procurement solicitation through numerous informational mailings, public meetings, workshops, and other consultation with the fish and wildlife agencies, Indian tribes, the Northwest Power Planning Council, and other interested parties. This process was undertaken because of BPA's policy to rely on the expertise of the agencies and Tribes and to fulfill one of BPA's agency goals, which is to work closely with Federal agencies, the Council, Indian tribes, and other entities in implementing the fish and wildlife provisions of the Pacific Northwest Power Planning and Conservation Act.

The process used in FY 1984 has taken a great deal of time and effort by all concerned. However, I believe this can be ascribed to the newness of the program, the complexity of the issues it raises, and the multiplicity of participants with often conflicting jurisdictions and viewpoints. I believe that in the future the implementation planning process will be more efficient, simply because participants will have a better understanding and expectation of the process.

Regarding our procurement process, the solicitation of proposals and funding of measures is accomplished through the normal Federal procurement process. That is, a solicitation document is developed, proposals are submitted to BPA in response to the solicitation document, proposals are reviewed for technical adequacy and cost, and a proposal is selected, negotiated and ultimately funded. Initiation of the procurement process to contract signing normally takes four to six months, the longer period being required for more complex projects.

Question: BPA has stated that it has "problems" with funding operating costs of fish enhancement projects identified in the Council's program. Please explain the nature of BPA's concern about funding operating costs.

Answer: BPA is uncertain of the source of the statement you refer to. BPA presently pays for much of the operating costs of Columbia River mitigation facilities. For example, the ratepayers assume the power share of the cost of operation and maintenance associated with all Corps of Engineers and Bureau of Reclamation projects, including costs for fish and wildlife purposes. In FY 1984 it is estimated BPA will reimburse the U.S. Treasury $11.4 million for the fish and wildlife portion alone.

The Council's Fish and Wildlife Program urges BPA to assume the operating costs of many new facilities planned in the Columbia River Basin. While some of these costs are appropriate for BPA ratepayers to bear, others are not. We do not believe Congress intended that BPA should bear the full cost of fish and wildlife mitigation, but that costs, where appropriate, be shared with other users and beneficiaries of the Columbia River as well. Assumption of operating costs by others for facilities paid for by BPA helps ensure the incorporation of more economic design features, and more efficient operation, than if BPA were to provide the funds. This is particularly true at project sites where fish and wildlife problems were caused by other than hydroelectric development.

We have issued neither a blanket approval nor disapproval with regard to funding the operation and maintenance of hatcheries, passage facilities, fish screens, or habitat improvements. Rather, we will carefully weigh the prudence of each request received for operation and maintenance funding on its individual merits and in the light of the prohibition in the Pacific Northwest Power Planning and Conservation Act against BPA's making expenditures authorized or required from other entities under other agreements or provisions of law.

Question: What is BPA's position with respect to the transfer of funds to the Bureau of Reclamation for design and/or construction of fish passage facilities at all Yakima River sites specified in Section 900 of the Council's Fish and Wildlife Program, prior to enactment of S. 1027 or similar legislation?

Answer: Within the limitations of the Pacific Northwest Electric Power Planning and Conservation Act and the Federal Columbia River Transmission System Act, BPA has agreed to transfer funds so that the Bureau may conduct preliminary investigation and design work on Yakima fish facilities. Without passage of S. 1027, BPA is uncertain whether key elements of the Yakima fish enhancement program will be authorized or constructed. Prior to authorization, BPA cannot fund major projects in the Basin. Although BPA has sufficient authority to fund contruction of less expensive upstream facilities, the effectiveness of such action would require reevaluation since the Yakima facilities are inter-dependent.

Question: Will funding be available to construct the Minthorn Springs facility so that the facility is functional for acclimation of juveniles in the spring of 1985 and the holding of adults in the fall of 1985? If not, what schedule does BPA intend to follow?

Answer: Yes, funding is available for construction of the Minthorn Springs acclimation facility so that it will be functional by the spring of 1985. We are presently proceeding with the development of a contract for its final design. Construction is scheduled to begin upon approval of the design by the Confederated Tribes of the Umatilla Indian Reservation and the Oregon Department of Fish and Wildlife. Our present expectation is to have available a fully functional juvenile acclimation and adult holding facility at Minthorn Springs by April 1, 1985.

Question: Are funds for proceeding with the design and construction of the Umatilla hatchery included in the FY 1985 budget? What specific authority and/or funding is needed to proceed with and complete construction in FY 1985?

Answer: Funds are not included in BPA's FY 1985 budget for design and construction of the Umatilla Hatchery.
Section 704(i)(1) of the Council's program recommends design, construction, operation, and maintenance of juvenile salmon and steelhead release and adult collection and holding facilities, not the construction of the Umatilla hatchery. The referenced facilities are the Bonifer Springs Acclimation Pond, already constructed, and the aforementioned Minthorn Springs Acclimation Pond. The Council is presently considering an amendment to the Fish and Wildlife Program which would incorporate a measure calling

for construction of the Umatilla Hatchery. Bonneville, however, has agreed to fund a feasibility study in FY 1984 which will consider hatchery site and design alternatives.

Question: Does BPA intend to proceed with construction of fish passage facilities at Three Mile Dam in FY 1985? What is the funding and schedule profile for FY 1985? What is needed to complete construction in FY 1985? What is the total cost of the project?

Answer: Yes, BPA does intend to proceed with construction of fish passage facilities at Three Mile Dam in FY 1985. BPA is currently negotiating a contract with the Bureau of Reclamation, the project owner, to resolve fish passage problems and provide adult collection facilities at Three Mile Dam. FY 1984 funds will be used to investigate various alternatives available to improve fish passage at the project, develop cost estimates, and prepare construction schedules. However, we intend to rely upon the expertise of the fishery agencies and Umatilla tribe in selecting the preferred design from the alternatives being analyzed by the Bureau of Reclamation.

The current schedule we intend to follow will have the preliminary design alternatives identified by September 30, 1984. selection of the preferred preliminary design is expected to occur no later than January 31, 1985. Final design will be initiated upon selection of the preferred preliminary design, and construction is expected to begin in late FY 1985 or early FY 1986.

BPA's proposed budget for FY 1985 includes $264,000 for fish passage improvements at Three Mile Dam. These funds will be used to develop final design of the preferred alternative identified in the feasibility study, which will be conducted by the Bureau of Reclamation with BPA FY 1984 fish and wildlife funds. Current information suggests the cost of the project is between $1.5 million and $2.0 million.

Question: In your view, what should be done to accomplish flow augmentation in the Umatilla River system so that full anadromous fish population potentials can be reached?

Answer: BPA is keenly aware of the flow problems that exist in the Umatilla River Basin. These problems appear to be the result of over-appropriation of water resources, which includes usage of both the Umatilla River and ground water resources in that region. The Bureau of Reclamation is currently developing a plan for alleviating at least part of the Umatilla River Basin flow problem as it relates to fish survival. This plan proposes augmentation of instream flows by pumping from the Columbia River and construction of additional headwater storage reservoirs. Even with the Bureau's proposed flow augmentation plans, it appears that a reassessment of water usage in the Basin is needed to realize full anadromous fish population potentials in the Basin. BPA is closely monitoring the development of the Bureau's plan and other flow augmentation efforts needed to protect existing and future fishery investments BPA may make in that Basin.

Question: If Bonneville assumes responsibility for Mitchell Act hatcheries, what changes do you foresee making in their operation?

Answer: The Administration's bill to transfer funding responsibilities for the Mitchell Act hatcheries specifies that BPA shall give due weight to the recommendations and expertise of the Secretary of Commerce in determining necessary hatchery funding levels. BPA, as a power marketing administration with new fish and wildlife responsibilities, does not intend to supplant the management authorities or capabilities of State and Federal fishery agencies and Indian tribes.

It is my understanding that the National Marine Fisheries Service, which has been operating the hatchery system since its beginning, would still be the fisheries management entity that would develop recommendations for annual hatchery operations and, therefore, funding levels. The Planning Council would have an opportunity to review and comment on those recommendations. BPA would utilize such recommendations as the basis for determining the amount of funds to be budgeted for transfer annually to the NMFS for hatchery management. I would not anticipate BPA initiating any significant changes in the operation of the hatcheries by NMFS, provided the information supplied to BPA is sound and complete.

Question: Please provide for the Committee the legal basis for BPA's view that legislation is necessary to enable Bonneville to fund the operation of these facilities.

Answer: Section 4(h)(10)(A) of the Pacific Northwest Electric Power Planning and Conservation Act provides that "[Fish and wildlife] expenditures of the [BPA] Administrator ... shall be in addition to, not in lieu of, other expenditures authorized or required from other entities ...."

Operation and maintenance costs for the Mitchell Act hatcheries are presently funded through appropriations to the National Marine Fisheries Service. This appropriations funding process has been utilized by NMFS and its predecessor, the Bureau of Commercial Fisheries, since the first Mitchell Act hatcheries were constructed in 1949. The operation and maintenance of the Mitchell Act facilities were therefore "authorized or required" to be funded by an "other entity" when the Pacific Northwest Power Planning and Conservation Act was passed in 1980. The House Interior Committee Report indicates that Congress intended "Other fisheries efforts outside [the Regional Act] ... to continue and to be funded separately." Accordingly, BPA ratepayers are precluded from paying for the operation and maintenance of the facilities absent an act of Congress.

Question: If enabling legislation is not enacted in FY 1985, what are your plans for the $8.2 million of borrowing authority included in the budget request?

Answer: The $8.2 million in BPA's FY 1985 budget for the Mitchell Act hatcheries is for operating expenditures, not borrowing authority. BPA's understanding is that we cannot assume funding responsibility for the hatcheries without congressional authorization.

Question: Provide the Committee with a status report on capital investments at Sunnyside Dam, Wapato Dam, Old Reservation Canal and Toppenish Creek/Satus Unit, including the need, the total estimated costs, proposed funding for each phase, and the proposed schedule under the budget request, and the optimal schedule. What additional authority, resources, or agreement is necessary to proceed with construction of these facilities in FY 1985?

Answer: Sunnyside Dam, Wapato Dam, and Toppenish Creek/Satus Unit are the three major capital projects in the Yakima Basin which are contained in BPA's budget for proposed funding in FY 1985. These facilities are major obstructions to salmon and steelhead passage in the lower Yakima River. The need for fish passage improvements exists at all the lower Yakima River diversion dams, with emphasis being placed on the lower mainstem Yakima River projects in FY 1985.

The funds will be used for the design and construction of fish screens and new fish ladders at the sites. Most of the fish screens and ladders are old, and the designs of the screens and passage facilities are outdated by current standards. No additional resources or agreement is necessary to proceed with the construction of these facilities in FY 1985 under the current budget schedule. The following table shows the funding levels by year and total costs for these projects. Old Reservation Canal's funding is included with Sunnyside Diversion Dam's funding.

BONNEVILLE POWER ADMINISTRATION
YAKIMA BASIN PROJECT FUNDING -- CURRENT SCHEDULE

	FY 1985	FY 1986	Total
	($ Thousands)		
Sunnyside Diversion Dam	$ 694	$3,710	$ 4,404
Wapato Diversion Dam	$ 747	$3,997	$ 4,744
Toppenish/Satus Unit	$ 239	$1,290	$ 1,529
Total	$1,680	$8,997	$10,677

Question: Why is there no request in FY 1985 to proceed with Prosser Dam, Roza Dam, and Easton Dam improvements? Provide a complete project sheet on each of these projects, including total estimated cost.

Answer: BPA does not have the responsibility for those projects. We have forwarded your question and request for a project sheet to the Bureau of Reclamation, the owner of those facilities, for their response. Section 4(h)(10)(A) of the Pacific Northwest Power Planning and Conservation Act provides that BPA may not assume the fish and wildlife obligations of other entities without Congressional authorization.

Question: Specifically, describe in detail any plans or schedule to proceed with the Prosser Dam modifications?

Answer: Since the Bureau of Reclamation, and not BPA, is currently responsible for any Prosser Dam modifications, your request for plans and schedule of such modifications has been forwarded to the Bureau for their response.

CONSERVATION

Question: Your statement on page 7 of the addendum indicates that there are 5 items where the Planning Council is concerned that BPA's program is inconsistent with their Two-Year Action Plan. Please comment on these differences and explain the reason for your allocation of funds?

Answer: Of the 96 conservation-related individual action items requested of BPA in the Northwest Power Planning Council's Two-Year Action Plan, BPA originally identified 12 which faced serious impediments to implementation. During the last several months, BPA and the Planning Council staff have had a number of consultations to narrow the differences between BPA programs and the actions identified in the Two-Year Action Plan. As a result of these meetings, the number of inconsistencies has been narrowed to six in five different sectors.

The Two-Year Action Plan requests that BPA develop and implement regionwide conservation programs which will acquire targeted levels of savings, within the two-year period, which the Planning Council argues is necessary to demonstrate the capability to acquire sufficient conservation savings if and when needed. The following table shows the six affected areas.

BONNEVILLE POWER ADMINISTRATION
AREAS UNDER DISCUSSION WITH THE PLANNING COUNCIL

SECTOR	ACTION ITEMS	DESCRIPTION
Commercial	5.1	Develop and implement a regionwide commercial conservation program for existing buildings.
	6.7	Develop and implement a program that provides incentives for meeting model building standards in new buildings.
Industrial	9.1	Develop a regionwide industrial conservation program.
Irrigation	10.1	Develop a regionwide irrigation conservation program.
Appliances	4.1	Develop and implement a regionwide appliance efficiency demonstration program.
Street & Area Lighting	12.13	Terminate financial assistance for street and area lighting improvements during the current period of surplus.

Through staff-to-staff consultations, BPA and the Planning Council have jointly laid out a plan for developing capability to implement conservation programs in each of these sectors. However, we feel that the development and demonstration of capability does not require the attainment of the Council's targets in regionwide programs, especially in a period of power surplus.

BPA and the Council staff have agreed that the Street and Area Lighting Conservation Program should continue in FY 1984 and that they will consult further on whether to continue the program in FY 1985.

Question: Are there differences between the BPA program and the Council's plan in terms of the energy savings targets for FY 1984 through FY 1988?

Answer: The energy savings targets for those years are essentially the same. After making some necessary adjustments to the Planning Council's targets to allow comparison with BPA's targets, both total approximately 250 average megawatts of savings. The adjustments were made to account for the fact that some electric utilities in the region did not sign contracts with BPA to implement our conservation programs. I would like to present a table that shows the targets and distribution by sector. You will see that the distribution is also very similar.

BONNEVILLE POWER ADMINISTRATION
ENERGY CONSERVATION TARGETS -- FY 1984-1988

Sector	Council Target	BPA Programs
Residential	120	108
Commercial	57	47
Governmental	9	24
Industrial	45	63
Agricultural	20	11
	251	253

Question: Explain your rationale for the proposed reduction of $12.8 million in residential weatherization from the FY 1984 level. What is the impact of the reduction? What would be the impact of another $10 million reduction in this portion of the conservation budget?

Answer: The proposed $12.8 million reduction in residential weatherization from the FY 1984 budget represents BPA's efforts to move the program to a minimum viable level that assures attainment of the least-cost mix of resources. Some disruption in the program may occur for weatherization contractors who are operating the program at a level that is higher than the minimum viable level. Disruption may involve personnel reductions and reduced consumer interest. At a minimum viable level, the program will remain administratively feasible and capable of being accelerated, if needed, to meet changed circumstances involving the regional load-resource balance. The impact of another $10 million reduction could drop the program below the minimum viable level.

Question: Please provide a detailed break down of the $31,260,000 request for program development. Why is a $5 million increase necessary in FY 1985?

Answer: I have a table which shows a detailed breakdown of the program development segment of our conservation budget:

BONNEVILLE POWER ADMINISTRATION
ENERGY CONSERVATION PROGRAM DEVELOPMENT -- FY 1985

	($ millions)
Hood River Conservation Project (Conservation Case Study)	$ 2,410.0
Conservation Financing	$ 3,264.0
Conservation Assessment and Evaluation	$15,464.0
Conservation Technical Support and Marketing Research	$ 6,043.0
Conservation Engineering R D & D	$ 4,079.0
	$31,260.0

The $4.5 million increase from the FY 1984 budget is reflected mainly in the Assessment and Evaluation area and is primarily due to the need to step-up capability building efforts. All of our current pilot projects are slated to become regional acquisition programs by FY 1987. The completion of assessment and evaluation analyses related to these projects becomes, therefore, essential in FY 1985 and FY 1986. More important than merely being timely, of course, is meeting that schedule with programs that we know how to administer and that we are confident will work. In addition to our own desire that our current pilot efforts assure us the capability to reap future energy savings, the Planning Council has been deeply concerned and involved in these efforts, particularly with regard to Model Conservation Standards adoption, and the advancement of industrial and appliance efficiency programs.

Other areas in which assessment efforts in FY 1985 are crucial are Irrigated Agriculture, long-term Residential Weatherization, and Mobile Homes.

In FY 1985 we will be conducting our first regional commercial survey in order to establish a baseline for commercial stock and to assess conservation opportunities of that stock. Evaluation work on our Hood River Project will require a higher funding level in FY 1985 than originally projected due to the fact that start-up has taken longer than originally anticipated and much of the activity has been rescheduled from FY 1984 to FY 1985. Lastly, we will be continuing our End-Use Load and Conservation Assessment Program. This project involves the metering of over 1,000 commercial and residential structures. From analysis of the data that will be compiled through this metering, BPA will improve the accuracy with which it forecasts hourly and peak loads and predicts the effect of conservation measures on such loads.

Question: How will the $4.3 million increase in assistance for States and local governments be utilized in FY 1985? What will be accomplished?

Answer: The $4.3 million increase in assistance for States and local governments, which is reflected in the FY 1985 budget, is to support State and local government activities in the adoption, implementation and enforcement of the Council's Model Conservation Standards.

Question: Describe the need for the expanded industrial energy audit program.

Answer: The industrial energy audit program is being expanded to become a pilot acquisition program for the industrial sector in order to develop capability to quickly accelerate acquisition programs should unexpectedly high load growth occur in the region. This is consistant with the Planning Council's Two-Year Action Plan and BPA's resource planning which recognizes the number of uncertainties that could affect the load/resource balance in the region.

As a result of BPA's ongoing assessment activity to identify significant conservation potentials in the non-direct service industrial, non-agricultural sector, BPA has undertaken development of energy estimating engineering methodologies for use in several industries in the region. These will be tested and evaluated in FY 1985. In addition, the expansion of BPA's industrial program will involve the design and testing of various financial incentive mechanisms to overcome economic barriers that might otherwise inhibit adoption of new measures for increasing the electrical efficiency of industrial plants.

Question: There seems to be a large potential for cost-effective conservation measures in the irrigated agriculture program. Do you have the capability to more aggressively implement this program with additional funds?

Answer: We do not believe that additional funds would achieve significantly more energy savings in the agriculture program. We are currently funding the full amount of budget requests from every program operator, and plan to do that in FY 1985 as well. Our current budget is not a constraint to achievement of the long-range savings potential in the agriculture sector. We believe that our pilot program will build capability for a regional program that will acquire the cost-effective savings available from this sector in a timely manner.

Question: Has BPA determined whether the following programs are cost-effective given the current regionwide electric power surplus?

- Solar and Heat Pump Water Heating Program
- Commercial Financial Incentives
- New Commercial Buildings
- Industrial Energy Audit
- Sponsor-Designed Acquisitions

Answer: Of the five programs listed, only the Sponsor Designed Program is a BPA conservation resource acquisition subject to cost-effectiveness evaluation under the Pacific Northwest Power Planning and Conservation Act. Proposals accepted under this program are consistent with the Planning Council's Two-Year Action Plan, focusing on commercial/industrial applications under 40 mills/killowatthour in 1980 dollars. In addition, acquisitions under this program assist in meeting conservation acquisition targets in the proper time frame as part of a least cost mix of resources needed to meet BPA's load serving obligations mix. The remaining four programs are pilot programs and demonstration projects designed to build program capability for future acquisitions when their cost-effectiveness can be demonstrated.

Question: What determination was made as to cost-effectiveness of the above-mentioned programs in the last rate case?

Answer: At the time of last year's rate case, only the Solar and Heat Pump Water Heating Program was proposed as a BPA acquisition program. At that time the Planning Council's Two-Year Action Plan was not final. As a result, BPA applied the principles of its draft near-term resource policy which indicated that any near-term acquisition having a 20-year measurable life should not exceed 35 mills/killowatthour in cost to the power system. The Solar and Heat Pump Water Heating Program as proposed at the time involved an incentive structure which met this cost criterion.

Since that time, however, this program has been scaled down and redesigned as a market test of several delivery mechanisms. Additional performance data on solar and heat pump systems will also be gathered in this test.

Question: What measurement standard is being used to determine if these programs are cost-effective?

Answer: Only one of the listed programs, the Sponsor Designed Program, is currently a BPA conservation acquisition. BPA uses the Least Cost Mix Model to measure the cost effectiveness of various conservation measures and generating resources. The Least Cost Mix Model is a linear program that selects from similarly available and verifiable resources using supply curves and levelized costs developed from assessment and evaluation activities. Additionally, BPA's conservation acquisition programs are checked for consistency with the Planning Council's Two-Year Action Plan.

Question: Several utilities, including most investor-owned utilities in the region, did not sign BPA's long-term conservation contracts in 1983. Is BPA proposing to move conservation dollars that would have been spent by those utilities into programs that are two to seven times more expensive per average megawatt saved?

Answer: BPA is not proposing to move the conservation dollars that would have been spent by nonsigning utilities into other programs. BPA reduced its proposed budget for FY 1985 by an amount which represented the financing of weatherization and street lighting acquisitions in nonsigning utility service areas.

Question: Given the current and projected surplus of power in the region, why should BPA begin new conservation acquisition programs while at the same time reducing existing programs that are less expensive per average megawatt saved?

Answer: BPA is not proposing to begin new acquisition programs in FY 1985, nor do we see a need to begin new acquisiton programs until FY 1986. In the meantime, BPA proposes to continue building the capability to develop the conservation potential of the residential, commercial, industrial, and agricultural sectors by designing and operating pilot programs and demonstration projects. The regionwide acquisition programs have been funded at levels consistent with meeting forecasted needs in the mid to late 1990's.

While it is true that the region presently enjoys a surplus of power, the region's load and resource balance is very dynamic. The current BPA Long-Term Load Forecast suggests that by 1990 the region will be somewhat deficit. This condition continues into 1992 when load resource balance is again temporarily attained. After 1992, however, the region's loads exceed its resources. If we have to meet these forecasted deficit situations with expensive conventional resources, we would have to begin construction immediately.

If we are to meet those future deficits with resources like conservation, which is less expensive than conventional resources, we need to begin to build the capability now. This involves developing and testing markets, developing and testing conservation measures, developing and refining operational and contractual mechanisms and infrastructures, and evaluating processes and results. This involves using BPA's borrowing authority in the near future.

The deficits will have to be met. The only question is what new resources we use to meet them. BPA is committed to a reliable, least-cost approach. That is the basis of the economic benefit. Conservation is cheaper than similarly reliable and available new resources.

Question: Has BPA studied the competitive impact which these conservation programs may have on the choice consumers face between alternate fuels?

Answer: BPA has not completed any specific studies which fully address this question. However, we have conducted, or are currently sponsoring, studies to collect data or estimate simulation model parameters which will help to analyze this issue. In the residential sector, BPA sponsored a project by the Oak Ridge National Laboratory and the MIT Energy Laboratory. An econometric study entitled Heating System and Appliance Choice was completed in 1983 which used data collected in our 1979 residential end-use survey to estimate an econometric model of heating system and appliance choice for new residences constructed in the Pacific Northwest. The equations and parameter estimates from this study are currently being placed in BPA's residential end-use forecasting model. The end-use model will be used to simulate some of the competitive impacts of conservation programs for new housing.

BPA is also collecting detailed cost and energy conservation data for new houses being constructed to meet the Planning Council's energy conservation standards in the Residential Standards Demonstration Project. Studies of conservation program impacts in existing houses are currently being conducted in our conservation program evaluation effort. These evaluations concern electricity savings only. However, we plan to use this and other data in a future residential end-use model development effort to incorporate the effect of conservation programs targeted at existing houses.

Less information is available in the commercial sector. BPA is currently placing a new commercial end-use forecasting model on its computer system which will have a limited capability to simulate competitive impacts of conservation programs. A major limitation in the development of this simulation model was the poor quality of data available in the commercial sector. BPA is currently planning to conduct a regional commercial end-use survey in FY 1985.

Question: Instead of reducing electric usage, will programs such as encouraging all electric home construction likely promote uneconomic fuel switching and increase electric consumption?

Answer: The impact of electricity conservation programs on fuel switching or aggregate electricity consumption can vary dramatically, depending upon the program design. At one extreme, a mandatory program for electricity use only, which places the increased costs of the program on the building owner or purchaser, might result in switching out of electricity into other fuels and a decrease in aggregate electricity consumption. At the other extreme, a program which pays the complete cost of program requirements might result in switching into electricity from other fuels. The change in aggregate electricity consumption would depend on whether the increase in electricity consumption from fuel switching is greater or less than the reduction in electricity consumption from the efficiency increases caused by the conservation program. With the exception of demonstration or information programs, most of BPA's conservation programs require a sharing of the costs of the program between BPA and the program participant. A variety of different mechanisms to share costs are used in the program design. A major purpose of our conservation program assessment and evaluation effort is to obtain data so we can better evaluate the energy impacts and cost effectiveness of alternative designs. Theoretically, there is a "breakeven point" in the design of a program where there would be no fuel switching impact. In practical terms, we are just beginning to develop the data and analytical tools which will provide a rough estimate of the competitive impacts of conservation programs.

IRRIGATED AGRICULTURE

Question: BPA has embarked on a pilot program that offers irrigaton utilities nonfirm power at reduced rates during the early irrigation season. Do you have any estimate as to how many utilities and irrigators will take advantage of this offer?

Answer: So far fifteen utilities have signed BPA'S offer to provide nonfirm power during the March and April early irrigation season. At this time BPA has no estimate of the number of utilities or irrigators that will take advantage of this offer.

Question: Is it your intention to offer other pilot programs that serve to assist both irrigators as well as BPA?

Answer: Yes. BPA has circulated for comment a proposal for a second pilot program to serve nonfirm energy to irrigation loads in May, for those utilities that cannot use the March-April program. BPA has also been discussing other possible pilot programs with utilities. If BPA determines that any of the proposals under consideration are beneficial to BPA, irrigators, and utilities, BPA will offer that proposal or proposals.

Question: Also, does this pilot program only apply to certain types of utilities, or is it designed for regionwide application?

Answer: All of BPA's customers had the opportunity to participate in and could have signed the March-April offer. However, irrigators throughout the region have diverse needs and circumstances, and many utilities, mainly because of weather, were unable to offer their customers the March - April early irrigation season program.

Question: Do you plan on embarking on any specific rate incentive programs designed to restore and maintain irrigation levels in the long term?

Answer: BPA has established a pilot project whereby nonfirm energy could be used for all irrigation loads during the billing months of March and April 1984. Under the pilot project, nonfirm energy will be sold to utilities at 13.9 mills per kilowatthour for March and April irrigation loads. BPA's normal equivalent firm power rate for firm irrigation loads during those months is roughly double the 13.9 mill rate. It is assumed that utilities will pass these savings on to their irrigation customers. BPA is interested in experimenting with ideas for other possible programs that would provide nonfirm energy for irrigators within a framework of assuring adequate BPA revenues.

Based on preliminary discussions with Northwest Irrigation Utilities, BPA expects to receive specific rate design proposals and analyses of the impacts of those proposals on both short term and long term irrigation loads from them. In addition, BPA has established a contract with Northwest Economic Associates that includes an analysis of the impacts on Northwest irrigation loads of specific rate designs. All this information will be taken into account before deciding whether special incentive programs will achieve significant benefits for both BPA and the region's irrigators.

Question: Would you consider offering a program that sells power to irrigators during off-peak periods, such as night, weekend or holiday differentials?

Answer: BPA's Priority Firm rate to utilities serving irrigation loads does have a differentiated capacity charge for off peak periods during the day. Under this rate structure, no capacity charge is assessed against loads that occur at night, 10 p.m. to 7 a.m. Monday through Saturday, or all day on Sunday. Saturdays and holidays are included in the peak period because the system load characteristics on those days are closer to the load characteristics of Monday through Friday than to those of Sunday. Both the demand and energy charges of the Priority Firm rate are seasonally differentiated so that the rate is lower on average during the irrigation season than during the rest of the year. The retail utilities reflect these features in their irrigation rates to the extent they find it appropriate to do so.

Question: How long of a period do you intend to offer pilot program(s) before you implement long term solutions?

Answer: The results of each pilot will be evaluated. Furthermore, BPA is developing an irrigation model for use in its rate process. BPA will continue to look at solutions as long as necessary to find one that is beneficial for BPA, irrigators, and utilities.

Question: Your staff has informed us that under existing law, the establishment of a seasonal irrigation rate is not possible. Would you please provide the Subcommittee your General Counsel's legal opinion regarding this conclusion?

Answer: The Office of General Counsel has not written a formal legal opinion on this subject. It should be noted that Sections 7(d)(1) and (2) of the Pacific Northwest Power Planning and Conservation Act expressly authorize BPA to offer a discount to customers with low system densities and to direct service industrial customers using raw materials indigenous to the Pacific Northwest region, respectively. No other provisions for special rate relief have been expressed in the Act. Any additional rate relief would place an inequitable revenue burden on BPA customers not receiving such relief. BPA's rates currently reflect the lower costs imposed on the Federal system by the predominately summer loads of irrigators. All rates developed by BPA must comply with the statutory requirement that such rates are "consistent with sound business principles."

Question: In anticipation of your 1985 rate adjustment, do you plan to undertake a cost of service study for irrigation customers, as a part of your determination in the establishment of rates for irrigation utilities?

Answer: BPA currently conducts a Cost of Service Analysis and a Wholesale Power Rate Design Study to determine the costs imposed on the system by loads occurring at different times during the year, and to determine the appropriate rate design adjustments to those allocated costs. The Cost of Service Analysis also considers the causes of costs related to the various products or services provided by components of the system at different times, including summer energy and capacity loads. Included in the Wholesale Power Rate Design Study is a Low Density Discount adjustment applied to the Priority Firm power bills of utility customers with low system densities. This is intended to help offset adverse effects on the retail rates of rural customers who have high costs due to low system density, difficult terrain, remote service areas and/or other factors. Many of the retail consumers who benefit from the Low Density Discount are irrigation consumers.

BPA has received a general proposal from Northwest Irrigation Utilities regarding such a cost of service study, and is waiting for a more detailed proposal before assessing the practicality of conducting a separate, special study. At this point, without any details regarding a proposed study, it is not possible to conclude whether a separate study is feasible or warranted. However, we do plan to continue discussions with Northwest Irrigation Utilities and expect a proposal to which we can respond more directly and fully.

Question: It has been suggested that irrigators who diligently strive to conserve water, thus saving energy, be given some type of discount on power. Have you considered the establishment of such a program?

Answer: BPA's Office of Conservation, in cooperation with the Division of Rates, has begun to explore a program that would have as its goal improving the efficiency of irrigation hardware, thus reducing the amount of electricity required to irrigate a given amount of land. Under this program, irrigators who can establish a certified increase in efficiency, relative to an audited baseline level, would qualify for a discount on their electricity. No proposal on this program is sufficiently well developed that public comment can be solicited. BPA's Office of Conservation is currently implementing a pilot program to provide incentives for the installation of hardware that would improve energy efficiency at irrigation farms. Concurrently, BPA is implementing a very limited water management program to examine the feasibility of developing an appropriate incentive program in the future.

LOAD, RESOURCE, AND ACQUISITION PLANNING

Question: Please provide a detailed breakdown of the $10,100,000 proposed FY 1985 expenditures in the "Load, Resource, and Acquisition Planning" budget component.

Answer: The following table shows the breakdown of the $10,100,000 for "Load, Resource, and Acquisition Planning" for FY 1985.

LOAD, RESOURCE, AND ACQUISITION PLANNING -- FY 1985

Load Forecasting	$ 3,732,600
Resource Evaluation	$ 4,947,300
Acquisition Planning	$ 1,420,000
Total	$10,100,000

Load Forecasting provides long-term forecasts of power needs and the Administrator's load obligations. It also provides detailed near-term forecasts for specific purposes such as rate setting, Coordination Agreement planning, and transmission planning. Resource Evaluation covers studies of resource costs, potential, and operating characteristics; modelling of resources; and technical studies. Acquisition Planning covers the development of program capability to acquire resources, purchase resource options, and offer billing credits.

Question: How does BPA's least-cost mix analysis methodology and acquisition planning take into consideration the Regional Plan adopted by the Northwest Power Planning Council?

Answer: BPA's least-cost mix analysis methodology is similar to that of the Planning Council's. The models used by the Planning Council and BPA have similar structures and many common data inputs. The methodology used by both the Planning Council and BPA does not itself reflect the Regional Plan. It produces findings that may be used in decisionmaking, including the establishment of a plan or the decision to implement a program.

BPA agrees in general with the generating resources acquisition planning components of the Regional Plan. BPA is implementing those portions of the Plan, as communicated in its response to the Planning Council dated August 15, 1983. This acquisition planning activity is principally related to the development of capability to option and acquire resources.

Question: To what extent, if any, are Power Council activities replicated by BPA in this budget component?

Answer: Load forecasting activities by the Planning Council are not replicated by BPA. BPA produces an annual long-term load forecast, three quarterly revisions to a mid-term load forecast, as well as monthly forecasts of loads. The Planning Council produces four ranges of forecasts for a 20-year period designed to offer alternatives for resource acquisition by BPA. However, those forecasts, which the Planning Council will probably produce every 5 years, are inappropriate to use in BPA's rate cases, customer service planning, and main grid transmission system planning.

BPA's direct-service customers forecasted loads, for example, were of critical importance in the last rate case because they were the foundation for revenue forecasting. Their importance in the next rate case will be even greater. In the 1983 rate case, the emphasis was on aluminum industries only, but in the next rate case all industries will be forecasted, plant by plant. Industrial energy purchases, which comprised 35.4 percent of total BPA sales in 1979, declined to 23.2 percent of the total BPA sales in FY 1983. Pacific Northwest aluminum plants are now "swing" plants, operating when aluminum prices are high and curtailing operation when prices are low. Accordingly, their future operation is of the highest importance to BPA's future revenues. The Planning Council engages in no forecasting of this nature, which is so critical in BPA rate cases.

BPA's resource planning either complements or supplements the Planning Council's. BPA and the Planning Council have undertaken a number of cooperative planning activities such as the current hydro assessment work jointly funded and staffed by the Planning Council, BPA, and others. Those planning activities which supplement the Planning Council's are necessary in order for BPA to fulfill obligations which are not met by the Planning Council. To carry out its management responsibilities, BPA has supplemented the Planning Council's long-term resource plan with special in-depth analyses of such topics as intertie proposals and net-billed plant schedules.

Acquisition activities are directed at implementing actions indicated in the Regional Plan. They too do not replicate the Planning Council activities.

Question: Please explain how the $200,000 increase in this category for FY 1985 is "in part the result of consolidation for display purposes of the acquisitions planning activity with this program component."

Answer: For the years prior to FY 1985, staffing costs for acquisitions planning were shown with the respective acquisitions programs such as billing credits or acquisitions. The costs for other resources shown individually in the Resource Planning, Acquisition, and Oversight Program, namely Idaho Falls and the net-billed plants, do not include staffing costs. To allow more accurate comparison of these resources with acquisition programs, the FY 1985 acquisition programs' staffing costs were moved to "Load, Resource, and Acquisitions Planning." Nearly all of the $200,000 increase in costs for this category is caused by inflation.

Question: Please describe any contractual obligations that exist in this budget component.

Answer: In FY 1985, a total of $2.7 million will be contracted in Load, Resource, and Acquisitons Planning. Of that amount, $1.1 million will be used for load forecasting and modeling contracts; $1.2 million will be used for studies of the cost and other characteristics of alternative generating resources; and over $.4 million will be used in developing resource acquisition programs and reviewing nuclear insurance for Supply System projects, and obtaining specialized advice on financing generating and conservation projects.

Question: Please provide a detailed breakdown of the $13,000,000 proposed FY 1985 expenditures in the Generating Resources RD&D budget component. Please describe the contractual obligations that exists in the component.

Answer: The following is a table that shows the breakdown of the $13,000,000 for Generating Resources RD&D for FY 1985 and the contractual obligations BPA will incur.

GENERATING RESOURCE RD&D - FY 1985

	Total Expenditures	Contracts
Hydro	$ 1,804,600	$ 900,000
Geothermal	$ 1,553,000	$ 960,000
RD&D for High Efficiency & Conventional Technology	$ 2,957,800	$1,500,000
Solar	$ 164,600	$ 50,000
Cogeneration	$ 4,387,400	$2,287,000
Wind	$ 2,132,600	$1,070,000
Total	$13,000.000	$6,767,000

ELECTRIC POWER RESEARCH INSTITUTE

Question: Please describe the benefits to BPA from participating in the Electric Power Research Institute's (EPRI) activities.

Answer: BPA supports EPRI in recognition of its utility responsibility to participate in, and not just reap the benefits of, the utility industries consolidated research and development activity. In addition to providing financial support, BPA supports EPRI by actively pacticipating in the EPRI advisory structure to ensure that the research needs of BPA and its customers are adequately addressed, and to be in a position to quickly benefit from research results. The benefits and advantages to BPA and its customers lie both in the application of research results and in the opportunity afforded to influence research decisions.

There are some specific benefits of our EPRI participation. EPRI is developing a new material, amorphous metal, which has the potential of reducing distribution transformer losses by 50 percent, a tremendous benefit to utilities. A recently developed quality control process will significantly reduce the failure rate of buried cables. A cathodic protection guide book developed by EPRI is now available. A wood pole inspection and treatment process will extend pole life 10-years, a significant savings to distribution systems. A remote entry computer system for preparing load forecasts and planning distribution systems is available and expected to save utilities considerable time and money.

EPRI's research and development strategy reflects the dynamic electric utility environment. Thus, in recent years, as a direct response to the changing needs of the industry, EPRI has increased its research emphasis on energy conservation, renewable energy systems, biological and health effects, and the human environment. The results of this shift in emphasis have already benefitted BPA and its customers in dealing with the specific energy problems of the Pacific Northwest.

Question: Please describe how financial participation in EPRI "complements BPA's in-house research and development program."

Financial participation in EPRI provides a natural complement to BPA's in-house research and development program for several reasons. Perhaps most significant is that through EPRI's pooling of research and development funds and expertise. BPA, as an EPRI member, influences the selection and execution of many research projects of a magnitude too large to be done in-house. Active involvement in the EPRI advisory structure provides, among other benefits, a forum for national research and development coordination which assists in the formulation of BPA's in-house research and development program and minimizes the probability of duplication of efforts. Also, the experience gained by BPA's EPRI advisors, continues to contribute significantly to the effectiveness of the in-house research and development effort.

Question: How was BPA's proposed FY 1985 contribution of $6.7 million determined?

Answer: In recognition of the continuing financial problems facing the region, BPA has committed to hold the 1985 contribution to no more than the FY 1984 level of $6.7 million.

Question: Please describe any contractual obligations that exist in this budget component.

Answer: BPA has an agreement with EPRI for its FY 1984 contribution and plans to execute the FY 1985 EPRI Agreement in the fall of 1984. There are no other contractual obligations in this budget component.

QUESTIONS SUBMITTED BY SENATOR LAXALT

MITCHELL ACT HATCHERIES

Question: The Administration has proposed legislation to shift the funding responsibility for the Mitchell Act anadromous fish hatcheries from the National Marine Fisheries Service to the Bonneville Power Administration (HR 5052). The present level of funding (FY 1984) for the 24 hatcheries and rearing ponds is $8.2 million. If Bonneville Power Administration (BPA) is responsible for funding these facilities in FY 1985, would you anticipate maintaining current production levels at all facilities? Would you expect this to continue for the forseeable future?

Answer: The Administration's bill to transfer funding responsibilities for the Mitchell Act hatcheries specifies that BPA shall give due weight to the recommendations and expertise of the Secretary of Commerce in determining necessary hatchery production levels. It is my understanding that the National Marine Fisheries Service which has been operating the hatchery system since its inception, would still be the fisheries management entity that would develop recommendations for annual hatchery funding and therefore production levels. BPA would utilize such recommendations as the basis for determining the amount of funds to be budgeted for transfer annually to NMFS for hatchery management. I would not anticipate BPA initiating any significant changes in the operation of the hatcheries by NMFS, provided the information supplied to BPA is sound and prudent.

Question: If H.R. 5052 is adopted by the Congress, does BPA intend to increase it fisheries staff or to rely on the expertise of State agencies and National Marine Fisheries Service?

Answer: BPA, as a power marketing entity with new fish and wildlife responsibilities, does not intend to supplant the management authorities or capabilities of State fishery agencies or National Marine Fisheries Service. BPA recognizes that if H.R. 5052 is adopted a small increase in staff effort may be necessary, particularly at the outset, to effect a smooth and efficient tranfer of the funding responsibility. Reliance on the fisheries staff expertise of State and federal fishery agencies is BPA's intent.

Question: Would BPA credit the expenditures associated with H.R. 5052 against the fisheries enhancement and mitigation responsibilities mandated by the Pacific Northwest Power Act? If so, why?

Answer: Yes. H.R. 5052 directs that BPA's expenditures be credited against our mitigation and enhancement responsibilities under the Pacific Northwest Power Act, and we believe this is sound policy. The Act directs BPA to protect, mitigate, and enhance the fish and wildlife resources of the Columbia River Basin to the extent affected by hydroelectric projects. Historically, the Corps of Engineers and the Bureau of Reclamation have provided mitigation costing more than $500 million and BPA is repaying that investment as well as reimbursing the Treasury for Corps and Bureau operation and maintenance at fish and wildlife facilities to help discharge this obligation. Additionally, BPA is now directly making major expenditures to carry out this responsibility. The burden of these costs properly rests with the region's ratepayers, who enjoy the benefits of the power the hydroelectric system produces. It would be inequitable, however, for the region's ratepayers to bear both this financial burden and the cost of additional mitigation for depleted fish runs not caused by hydropower. In fact, Congress expressed this view in the Pacific Northwest Power Planning and Conservation Act by stating as a principle in Section 4(h) that "Consumers of electric power shall bear the cost of measures to deal with adverse impacts caused by the development and operation of electric power facilities and programs only."

Question: What impact would the passage of H.R. 5052 have on BPA's ratepayers, assuming the Mitchell Act hatcheries were funded after all other fisheries responsibilities under the Power Act had been met? Please specify the annual aggregate assessment for residential, commercial, and direct service industry customers, as well as the average individual assessment in each category.

Answer: The proposed Mitchell Act funding is expected to account for about one-tenth of one mill per kilowatthour of the Priority Firm Power rate. Priority Firm Power is sold to public bodies, cooperatives and Federal agencies for resale and direct consumption, and is exchanged with utilities participating in residential purchase and sale agreements under Section 5(c) of the Power Act. BPA has not analyzed the effects of these costs upon individual consumer groups; however, it is clear that the overall impact upon these utilities' consumers would be very limited.

STATEMENT OF ROBERT L. MCPHAIL, ADMINISTRATOR, WESTERN AREA POWER ADMINISTRATION

Mr. Chairman and Members of the Committee:

I am pleased to present the FY 1985 budget request for the Western Area Power Administration (Western). Western is now in its seventh year as a supplier of Federal electric power to a large part of our Nation. As Western's Administrator, I am proud of our past accomplishments, and believe that the FY 1985 budget request will allow us to continue to achieve our objectives and the objectives of the National Energy Policy Plan. I will summarize Western's mission and organization and provide highlights of our FY 1985 budget request including the significant accomplishments of the past fiscal year.

MISSION, ORGANIZATION, AND STAFFING

Western is a federally operated electric power marketing agency responsible for the wholesale delivery and sale of power to 556 wholesale customers consisting of cooperatives, municipalities, public utility districts, private utilities, Federal and State agencies, irrigation districts, and project use customers. These wholesale power customers, in turn, provide service to millions of retail power customers in the following 15 States: Arizona, California, Colorado, Iowa, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Texas, Utah, and Wyoming. During FY 1985, Western will be responsible for the operation and maintenance of 16,315 miles of transmission line, 234 substations, and various appurtenant power facilities in a 1.3 million-square-mile geographic area. Electric power marketed by Western is generated at 48 hydropower generating plants operated by the Bureau of Reclamation (BuRec), the Corps of Engineers, and the International Boundary and Water Commission in our service area. Additionally, Western markets the United States 24.3-percent entitlement from the large Navajo coal-fired plant near Page, Arizona. The current installed generating capacity of these plants is 8,455 megawatts (MW). The FY 1985 budget request for Western provides for 1,408 full-time equivalents (FTE) to carry out Western's mission, a decrease of 4 FTE below our FY 1984 level of 1,412 FTE. This reduction is a result of the President's management initiative program.

BUDGET HIGHLIGHTS

For fiscal year 1985, Western is requesting $248.2 million in new budget authority, a decrease of $14.6 million below the total available in FY 1984. These funds are for continuing rehabilitation, upgrade, or replacement of transmission lines and associated facilities and for regular system operation and maintenance expenses. No new budget authority is requested for the emergency fund. This fund is maintained at a $500,000 level, on a continuing basis, and the emergency fund is replenished from affected project power revenues. In addition for FY 1985, we estimate an obligational authority requirement of $93.6 million for the Colorado River Basin Power Marketing Fund, a decrease of $7.9 million below the FY 1984 program. Specific appropriation and fund amounts compared to funds available in FY 1984 are as follows:

PROGRAM SUMMARY
(Dollars in thousands)

Appropriation/Fund	FY 1984 Program	FY 1985 Request	Change
Construction, Rehabilitation, Operation and Maintenance	$262,819 1/	$248,230	-$14,589
Colorado River Basin Power Marketing Fund 3/	101,500	93,600	-7,900
Emergency Fund	840 2/	500 3/	-340
TOTAL Program	$365,159	$342,330	-$22,829

1/ Includes $68.2 million of prior year carryover of which $30 million is attributable to the FY 1983 supplemental appropriation for the Sidney DC Tie additions and $25 million is planned carryover which is required for the FY 1984 purchase power and wheeling program.

2/ Includes $500,000 of new budget authority and $340,311 of prior year carryover.

3/ Request for obligational authority only.

CONSTRUCTION, REHABILITATION, OPERATION AND MAINTENANCE

In FY 1985, we are requesting $248.2 million for ongoing construction, rehabilitation, and operation and maintenance activities. This request includes no new major construction projects. Specific activity appropriation amounts of this fund compared to funds available in FY 1984 are as follows:

Activity	FY 1984 Program	FY 1985 Request (Dollars in thousands)	Change
Construction and Rehabilitation	$116,917	$ 83,330	-$33,587
Systems Operation and Maintenance	77,205	75,000	-2,205
Purchase Power and Wheeling	68,697	90,000	+21,303
Subtotal, Operating Expenses	$262,819	$248,330	-$14,489
Savings from Management Initiatives	-	-100	-100
TOTAL	$262,819	$248,230	-$14,589

Construction and Rehabilitation

The FY 1985 budget for construction and rehabilitation is $83.3 million, a decrease of $33.6 million below the FY 1984 program. This request is required for Western to meet its mandated responsibility for the delivery of power to our customers. In order to maintain system reliability, meet current safety and environmental standards, and serve customer loads, Western must rehabilitate, upgrade, or replace transmission facilities which have reached the end of their useful service, have become overloaded, or have sustained damage. In addition, Western constructs new transmission facilities to avoid major outages, to interconnect with other utilities to offset the use of higher cost energy, to provide increased capacity by reducing the current overloading of existing facilities, and to further Western's Oil Conservation Program.

The FY 1985 request includes $6.1 million for continuing construction activities on the Great Falls-Conrad 230-kV transmission line. When placed in service in late FY 1985, this new line will relieve the present overloading of existing transmission facilities in the north central area of Montana.

The request also includes $2.1 million for continuing work on the Sidney 200-MW AC-DC-AC Tie additions at Sidney, Nebraska. A $30 million FY 1983 supplemental appropriation was provided in September 1983 for construction of this facility to interconnect Western's eastern and western transmission systems. This tie will allow us to meet Federal load responsibilities, promote diversity exchanges, and displace oil-fired generation with lower cost energy. Currently we are reviewing design/construction contract proposals which we expect to award by June 1984.

Our FY 1985 budget request will also allow continuation of construction items related to ongoing improvements to Western's transmission system. Some of the more significant transmission improvements scheduled for work in FY 1985 include: $10.2 million for upgrading the severely deteriorated 77-mile Liberty-Coolidge 230-kV wood-pole transmission line, which will provide increased capacity to serve Central Arizona Project (CAP) pumping loads in southern Arizona; $7.8 million for upgrading the 150-mile Thermopolis-Alcova-Casper 230-kV transmission line which will allow capacity exchanges between Western and Pacific Power and Light Company, provide increased transfer capability through Wyoming, relieve overloading conditions, and replace old deteriorated 69-kV wood-pole transmission line structures; and $2.6 million for rerouting or reconstruction of the Devils Lake transmission line in North Dakota to protect the line from rising water and prevent line outages because of structure collapse. Preconstruction work, such as planning, environmental activities, design and specifications, and land and rights-of-way will be continued.

During the past fiscal year, work was completed on six substation additions and 91 miles of transmission line. In the current fiscal year, we plan to complete work on seven substation additions and 154 miles of transmission line, and in FY 1985, we plan to complete work on nine substation additions and 32 miles of transmission line.

Western Colorado 345-kV Additions

Last year Congress expressed interest in our efforts to construct additions to the Western Colorado Transmission System. There are three 345-kV transmission line components of this construction activity. From north to south, there are: (1) the uprate of Western's existing 98-mile Craig-

Rifle line from 230-kV to 345-kV, (2) the construction (jointly with Colorado-Ute Electric Association and Public Service Company of Colorado) of the 275-mile Rifle-San Juan 345-kV line, and (3) the uprate from 230-kV to 345-kV of the 8-mile Four Corners-Shiprock line. These additional transmission facilities will eliminate a serious bottleneck which constrains system operations, reduce major system outages, reduce energy losses, and increase the reliability of the interconnected transmission systems.

Construction was initiated in 1982 for uprating the Craig-Rifle line to operate at 345-kV and is now nearing completion. Also, work on the Four Corners-Shiprock 230-kV line component is underway and scheduled to be complete in December 1985.

There have been delays associated with the Rifle-San Juan 345-kV line. The Public Utilities Commission (PUC) of Colorado previously denied the Colorado-Ute Electric Association a permit for construction of double-circuit 345-kV transmission facilities between Rifle, Colorado, and San Juan, New Mexico.

Subsequently, Colorado-Ute Electric Association, Public Service Company of Colorado, and Western reformulated the project. Colorado-Ute Electric Association and Public Service Company of Colorado applied to the PUC for a permit to construct a single-circuit 345-kV line from Rifle to San Juan. On September 20, 1983, the PUC granted a permit to Colorado-Ute Electric Association and Public Service Company of Colorado for construction of the single-circuit 345-kV line. It is expected the project will receive environmental review in the spring of 1984 with construction starting later in the year. The total estimated cost of this reformulated project is $107.1, million of which Western's financial participation is approximately 50 percent.

Joint Participation

Western has actively participated with other utilities in joint planning and operating studies and in the construction of needed transmission facilities. It is through ongoing cooperative study efforts that mutual benefits of joint construction projects are first identified and formulated. Joint participation efforts lower costs to the Government and other participants, minimize environmental impacts by avoiding duplication of facilities, and allow economy exchanges of energy between utilities.

During FY 1985, Western will continue with the following joint participation arrangements:

- Western and Basin Electric Power Cooperative - design and construction of a direct-current (DC) converter station at Miles City, Montana. The FY 1985 request provides for final equipment check-out and testing activities for completion in early 1985.

- Western, Pacific Power and Light, and Tri-State Generation and Transmission Cooperative - construction of the Thermopolis-Alcova-Casper 230-kV transmission line in central Wyoming and necessary modifications to existing terminal facilities. This joint arrangement consists of three transmission lines and four substations. The FY 1985 request provides for award of construction contracts for the transmission lines and terminal facilities.

- Western, the Salt River Project, Southern California Public Power Authority, and other utilities in the Southwest - planning studies for a possible Mead-Phoenix DC transmission line. The major portion of funding for this work will come from non-Federal utility interests. It is expected that project feasibility will be determined by late 1984.

- Western and Bonneville Power Administration (BPA) - studying the feasibility of constructing a DC transmission line from Celilo Substation, Oregon, to Mead Substation, Nevada, to connect the Pacific Northwest and Pacific Southwest regions, as authorized by Public Law 88-552.
- Western, neighboring utilities and preference customers - studying the feasibility of constructing a third 500-kV AC transmission line and upgrading existing Central Valley Project 230-kV transmission lines between Oregon and central California, so that excess power in the Northwest can be marketed in northern and central California.

Interagency Agreements

Planning studies are currently underway to provide transmission service to seven irrigation pumping plants associated with the BuRec Dolores Project in southwestern Colorado. Initial service is scheduled to this project beginning in 1985, with the last of the plants scheduled to begin service in 1988.

Western is also conducting right-of-way acquisition activities and designing the ED-2 (substation) to Saguaro No. 2 115-kV transmission line and terminal facilities to serve the BuRec's CAP Tucson Aqueduct Phase A pumping plants. This 30-mile line will serve three CAP pumping plants. A construction contract is expected to be awarded in the second quarter of FY 1985, and the line placed in service by the end of 1986.

Western, under agreements with the Bureau of Indian Affairs (BIA), is to provide the power supply for the pumping requirements for the Ak-Chin Water Supply Project in central Arizona as authorized by the Ak-Chin Water Rights Settlement Act. Western finished most design and right-of-way work in FY 1983, additional work awaits further progress on project construction by the BIA.

SYSTEM OPERATION AND MAINTENANCE

Our FY 1985 request for system operation and maintenance is $75.0 million, a decrease of $2.2 million below the FY 1984 level. The reduction reflects a lower level of equipment acquisitions.

Of the total FY 1985 budget request, $62.9 million is for regular transmission system operation and maintenance expenses which includes classified and wage board employee salaries, travel and transportation, rents, communications, utilities, materials and supplies, data processing, and administrative and general expenses.

An additional $9.7 million provides for power system replacements and additions. Of this amount, $1.4 million will be used to purchase mobile equipment needed to maintain Western's electric power systems; $7.5 million is required to purchase telemetering, supervisory control, radio and protective relaying equipment, circuit breakers, and transformers to maintain and improve system reliability and operational efficiency, and for replacement and disposal of devices containing polychlorinated biphenyls (PCB); and $0.8 million is required for various maintenance and warehouse facilities for line crew workspace, storage of materials, supplies, and electrical and transportation equipment, and for energy efficiency improvements to existing facilities.

This request also includes $2.4 million for continuing customer-oriented activities under the Conservation and Renewable Energy (C&RE) Program.

Operation and Maintenance Improvements

Western is continuing to improve operation and maintenance management efficiency and reduce administrative costs. For example, Western is implementing a Maintenance Information System at its field offices to account for man-hours expended against specific equipment and other routine maintenance activities. An automated Warehouse Inventory System has also been implemented throughout Western. In addition to improving local inventory control, this system provides a Western-wide data base accessible to all inventory managers. Western's ongoing live-line maintenance/barehand training program has also improved our ability to avoid customer outages and enhance system reliability by making equipment repairs and replacements without deenergizing critically needed transmission facilities.

Wood-Pole Replacement Program

Western will continue in FY 1985 to inspect and replace wood-pole transmission structures that have exceeded their useful life. Western operates and maintains 8,611 miles of wood-pole transmission line (approximately 53 percent of the total transmission system) consisting of approximately 70,000 wood-pole structures. In FY 1983, we inspected wood-pole structures on 433 miles of line and replaced 140 wood poles. During FY 1984, we plan to inspect wood-pole structures on about 832 miles of line and an additional 709 miles of line in FY 1985.

Conservation and Renewable Energy

Our FY 1985 budget provides a total of $3.0 million ($2.4 million under Operation and Maintenance and $0.6 million under Colorado River Basin Power Marketing Fund) for customer C&RE program activities. Western's C&RE program is based on a strategy of combining cost-effective energy conservation measures and the development of renewable energy resources. Most projects are short-term (2 to 3 years) developments which can be sized to meet specific demand requirements, thus requiring substantially less capital investments than large conventionally fueled powerplants.

Western requires firm power customers to submit a program plan detailing their own conservation and renewable programs.

The plan must be forwarded to Western within 1 year of signing a new contract. To date, Western has received and approved over 450 customer program plans aimed at conservation and increased energy production from renewable resources.

PURCHASE POWER AND WHEELING

The FY 1985 budget request for purchase power and wheeling is $90.0 million, an increase of $21.3 million above the FY 1984 level. This request will provide for the purchase and wheeling of power to meet existing contractual commitments and for participation in the Oil Conservation Program. The increase is primarily attributable to higher costs for firming energy purchases to meet contractual commitments to our Central Valley Project (CVP) firm power customers in California.

Our FY 1985 budget level is based on contract commitments made in the mid-1960's. Western's future purchase power funding requirements, primarily for the CVP, will increase significantly because of depletion of lower cost banked energy and the requirement to purchase higher cost energy from the open market to meet load requirements under existing contracts. Although the commitments still exist, negotiations are currently under way which may lead to reductions in appropriated funds through energy imports and customer bill crediting arrangements.

Bill Crediting

The bill crediting arrangement procedure involves contractual agreements with one or more CVP customers whereby they agree to participate with Western in the creation and funding of a cosponsored account for the purchase of power. The contribution of the participants will be limited to the amount of the participants' power bill. Western will be obligated to supply, from its purchase power and wheeling budget, any portion of the purchase cost not supplied by the participants. The resultant contributions made by each customer will be credited against their power bill payments for the month.

We have previously presented this concept to the Committee as a procedure we were investigating. The degree to which this procedure will reduce the requirement for appropriated funds for purchase power depends on the number of CVP customers willing to provide funding and the amount of power sold to those customers. However, discussions with the CVP customers show they are in favor of funding an energy purchase of this type. We are now in the process of negotiating the required documents. Preliminary estimates indicate that up to $36.0 million of bill crediting may be obtainable in FY 1985.

Energy Imports to Central Valley Project

Our FY 1985 purchase power and wheeling budget is based on a blend of federally generated energy (assuming below-average water conditions), energy previously banked with the Pacific Gas and Electric Company, and energy support purchases from various Northwest entities to meet existing firm contract commitments.

Western has entered into a Memorandum of Understanding with BPA to provide a transmission path for the delivery of 185 MW of Basin Electric Power Cooperative power for the period 1986 to 1990. All other transmission for Northwest resources will be subject to the intertie access policy currently being developed by BPA.

In 1983, the California Water Resources Control Board removed the filling restrictions on the New Melones Reservoir. As a result of this action, the New Melones Powerplant is now capable of operating at its full 300-MW capacity. This situation, when combined with high carryover reservoir storage from 1982 and higher-than-normal precipitation in 1983, resulted in significant power generation increases in this area during 1983, which will enhance CVP hydrogeneration in future years.

FERC Review Process and New Delegation Order

In the report accompanying the FY 1983 Appropriations Bill, concern was expressed that the power marketing administrations have not been charging rates sufficient to repay their obligation and with the backlog and length of time it was taking the Federal Energy Regulatory Commission (FERC) to review proposed rate adjustments. In an effort to overcome these problems and to provide more guidance to the FERC concerning its scope of review, the Secretary of Energy issued a new delegation order which took effect December 14, 1983. Under this order, the Administrator of Western has the authority to develop power and transmission rates for the power system. The Deputy Secretary of Energy has been delegated authority to approve, confirm, and place in effect such rates on an interim basis. At the same time, the Secretary of Energy delegated to the FERC the authority, within certain defined standards of review, to confirm, approve, and place in effect on a final basis, to remand, or to disapprove such rates. With the guidance provided by this delegation order, it is anticipated that the FERC review will be much more timely and less controversial.

SMUD Settlement

I am pleased to inform the Committee that Western and the Sacramento Municipal Utility District (SMUD) reached settlement in the SMUD lawsuit in April 1983. The United States and SMUD have been involved in a power rate dispute since 1975. The major terms of the settlement include an agreement by Western to extend the term of SMUD's contract for the purchase of CVP power from 1994 to 2004, to entitle SMUD to a portion of the CVP power marketed by Western from 2005 through 2014, and return to SMUD an escrow account balance of approximately $41.0 million which reflects the expense of purchased power. We estimated that an adverse decision in the case could have cost all CVP power customers, except SMUD, approximately $345 million (present worth) in the form of higher CVP power rates. SMUD's agreement to pay the CVP rate in effect on November 1, 1984, and thereafter, resulted in a present worth benefit of $260 million to the other CVP customers, including Federal agencies.

Results of Oil Conservation Program

Western's Oil Conservation Program takes advantage of the flexibility of the large Federal reservoir system in our power marketing area. Surplus low-cost thermal energy is purchased during offpeak load periods to supply Western's customers which allows water to be stored in Federal reservoirs for later use. Hydropower is then sold during onpeak load periods to customers who would otherwise use oil- or gas-fired generation.

During FY 1983, Western experienced its most successful year to date, displacing the equivalent of approximately 11.1 million barrels of oil. These total savings exceeded our FY 1982 total by nearly 5 million equivalent barrels primarily as a result of the second consecutive extremely good water year for essentially all of Western's 15-State power marketing area. FY 1983 was the sixth consecutive year that Western's total equivalent oil displacement savings have increased at a rate of 10 percent or better. Western anticipates continued successful results from this ongoing program during both FY 1984 and FY 1985 if currently projected above-average water conditions occur.

For the period of December 1972 through September 1983, over 60 million equivalent barrels of oil have been displaced through Western's Oil Conservation Program. During FY 1984 and FY 1985, Western's goal is to displace at least six million equivalent barrels of oil each year.

Increased revenues to the U.S. Treasury associated with sales from this program have amounted to over $300 million. These revenues are in addition to those collected from normal power sales and have the effect of minimizing Western's firm power rate increases.

Resource Coordination Program Status

Western's Resource Coordination Program involves integration of Federal hydroelectric generation with customer thermal generation. The objective of the program is to operate customer thermal plants and Federal hydropower plants at their most technically and economically efficient output levels. To the extent that such coordinated operation produces more energy than required to meet thermal plant owners' load obligations during daily and seasonal low-load periods, the excess thermal energy is used to supply Western's load obligations. This hydrothermal integration approach enables Western to back-off Federal hydroelectric generators and save water that would otherwise have been used for generation during low-load periods.

The stored water is subsequently used for generation of energy; the surplus energy is sold during daily and seasonal high-load periods when this energy is most valuable. The benefits of hydrothermal integration are shared by Western and the contributors of the excess thermal energy. Revenues received by Western are applied to repayment of the Federal facilities used in this program.

During last year's operation, the Resource Coordination Program, which has been most active in the Wyoming-Colorado-Nebraska area, has resulted in estimated energy sales of 1,727 gigawatthours and associated revenues of about $25 million.

COLORADO RIVER BASIN POWER MARKETING FUND OPERATING EXPENSES

In FY 1985, Western's estimated obligational authority requirement for this fund is $93.6 million, a decrease of $7.9 million below the FY 1984 level. This decrease reflects revised estimates for participation in the Oil Conservation Program.

Under the Colorado River Basin Power Marketing Fund, encompassing the Colorado River Storage Project (CRSP), the Fort Peck Project, and the Colorado River Basin Project, all operation and maintenance and power marketing operating expenses (including a portion of the expenses of the BuRec and the Corps of Engineers) are financed from project revenues collected by Western. Revenues above actual project operating expenses are returned to the U.S. Treasury to repay Federal investments.

Colorado River Storage Project

In FY 1985, $21.5 million is required for CRSP power marketing and transmission expenses and $50.6 million for purchase power and wheeling and Oil Conservation Program activities. As previously mentioned, of Western's $3.0 million C&RE program, about $0.6 million is derived from the Colorado River Basin Power Marketing Fund.

Additionally, $4.2 million of the CRSP request will be used for substation rehabilitation, replacement of substation equipment, various tools and work equipment, and communication and control equipment, including supervisory control and data acquisition (SCADA) equipment at the Montrose, Colorado, power operation center. Most of the equipment at the center is 20 years old and now obsolete. Operation and maintenance costs of the existing equipment are high, replacement parts are difficult to obtain, additions and modifications are difficult and costly to implement, and system performance is generally inadequate by current standards. New state-of-the-art SCADA and automatic generation control systems are needed to replace and consolidate all of the existing systems under one supervisory control unit.

The remainder of the FY 1985 budget request will cover normal operation and maintenance expenses and interest on the investment.

Fort Peck Project

Western requires $20.8 million in FY 1985 to operate and maintain the Fort Peck Project transmission system and market available power. Of this amount, $2.5 million is required to meet Corps of Engineers expenses associated with operating and maintaining the power generating facilities, and the balance of $18.3 million is Western's share of operating expenses including expenses for Fort Peck-Havre 230-kV transmission facilities. The contract award for the Fort Peck-Havre transmission facilities was made in January 1984, and work is scheduled for completion in December 1985.

Colorado River Basin Project

The budget request of $0.7 million provides for power marketing expenses associated with the Navajo Generating Station at Page, Arizona, and power marketing and operation and maintenance expenses for the Central Arizona Project.

EMERGENCY FUND

In FY 1985, Western is not requesting additional appropriations for the emergency fund. Adequate funds are estimated to be available at the start of FY 1985 to meet emergency expenses since language included in the FY 1984 Appropriations Act provides for replenishing the fund as emergencies occur. Funds expended for emergencies are replenished on a continuing basis from the affected project power revenues. By maintaining the emergency fund on a continuing basis, Western can eliminate the potential need for regular or supplemental appropriations should an emergency or series of emergencies occur which require funding beyond $500,000.

In FY 1983, $368,000 was expended for repairs to transmission line structures on the New Underwood-Stegall 230-kV transmission line in Nebraska and structures and substations in southern Arizona which were damaged by flooding.

POWER RATES, REPAYMENT, AND REVENUES

Power Rates

Western is required by law to maintain rates which are adequate to meet the repayment requirements of each project. In order to assure that rates are sufficient, an annual repayment study is prepared on each power project. The annual study determines if the project rate is adequate to meet repayment of costs allocated to power, and, if not, to establish rates which will cover these costs.

Repayment requirements are basically the same for all projects. Essentially, the requirement is to repay all costs which are allocated to power facilities, with interest, plus annual operation and maintenance expenses including purchase power and wheeling expenses. In addition, most multipurpose projects have a portion of irrigation costs which are paid by power revenues. Irrigation costs assigned to be repaid by power revenues are not subject to interest.

On September 30, 1983, the Secretary of Energy removed the half-percent annual adjustment "cap" on interest rates applicable to new investments not otherwise governed by statute. Beginning October 1, 1983, the interest rate will be the average yield during the preceding fiscal year of interest-bearing marketable securities of the United States having 15 or more years remaining to maturity.

Repayment

In order to maintain sound financial footing, Western, since its establishment in 1977, has implemented two rate adjustments for the Rio Grande Project; two for the Parker-Davis Project; one for the Fryingpan-Arkansas Project; and one, with two parts (Eastern Division and Western Division), for the Pick-Sloan Missouri Basin Program. Also, a special rate for the sale of economy energy under the Loveland-Fort Collins Area Office's Resource Coordination Program was implemented. We are currently in the process of completing a third adjustment for the Rio Grande Project, a special Western-wide split-savings rate, and a rate for third-party transmission in the CVP.

Recently, the FERC confirmed and approved, on a final basis, rate adjustments for the Rio Grande Project, the Resource Coordination Program, the CVP, the CRSP, and the Pick-Sloan Missouri Basin Program.

Based on study analysis, rate adjustments are expected to be initiated in the near future on the Pacific Northwest-Pacific Southwest Intertie Project, Collbran Project, CRSP, and Fryingpan-Arkansas Project.

As of September 30, 1983, the investment to be repaid by Western's power systems totaled approximately $3.9 billion of which $1.4 billion has been repaid. Cumulative power receipts total $5.1 billion and have been applied as follows: $1.6 billion for operation and maintenance; $0.8 billion for purchase power; $1.3 billion for interest and other expenses; and $1.4 billion for repayment for investment in facilities and assistance to irrigation. The following table summarizes Western's repayment status by project.

STATUS OF REPAYMENT AS OF SEPTEMBER 30, 1983

(Dollars in Millions)

	Cumulative 1/						
PMA and Project System	Power 2/ Investment	Power Receipts	Operating Expenses (O&M)	Purchase Power	Interest and Other	Repayment to Date	Unpaid Investment
Boulder Canyon	$ 139	$ 495	$ 288	$ 0	$ 87	$ 120	$ 49
Central Valley	744	986	33	514	225	214	530
Collbran	16	9	3	0	5	1	15
Colorado River Basin (Navajo)	231	431	320	0	47	64	167
Colorado River Storage	702	826	162	217	261	186	516
Falcon-Amistad	37	17	6	0	6	5	32
Fryingpan-Arkansas	173	6	3	0	5	0 3/	173
Parker-Davis	158	316	116	12	69	119	39
Pick-Sloan	1,585	1,963	646	92	541	684	901
PNW-PSW Intertie 4/	62	20	12	0	8	0	62
Provo River	1	3	1	0	1	1	0 6/
Rio Grande	14	31	16	5	10	0 5/	14
Western TOTAL	$3,862	$5,103	$1,606	$840	$1,265	$1,394	$2,498

1/ Data on an accrual basis of accounting and on the best information available at the time.

2/ Power investment to be repaid includes irrigation-assistance investment.

3/ Receipts collection to date are less than operating and interest expenses incurred due to slippage in startup of Mt. Elbert Unit No. 2.

4/ AC facilities only.

5/ Repaid to date is $211,000, which was rounded to zero.

6/ Unpaid balance is $136,000, which was rounded to zero.

Marketing Plan Status

During the past year, Western has continued work in the development of post-1989 marketing plans. These plans will be implemented upon the expiration of existing contracts during the time period between 1989 through 2004.

Power marketing plans for Federal power from the Pick-Sloan Missouri Basin Program (Western Division), the Fryingpan-Arkansas Project, the CRSP, Collbran, Rio Grande, and Provo River Projects are presently being developed to be effective beginning with the October 1989 billing period, coincidental with the expiration of existing contracts.

The general consolidated marketing plan for resources from the Boulder Canyon and Parker-Davis Projects and surplus power from the Navajo Generating Station was published in the *Federal Register* in May 1983. The next step is the allocation of these resources. This process has been delayed in anticipation of passage of H.R. 4275 that will set aside present litigation concerning Hoover power.

Revenue and Energy Sales

During FY 1983, Western marketed 42.5 billion kWh of available energy to 480 wholesale power customers (excluding 76 project use customers) and had total electric service revenues of $460.7 million. Our estimate for FY 1984 energy sales is 39.4 billion kWh and for revenues is $519.4 million. For FY 1985, energy sales are estimated at 36.7 billion kWh and revenues are estimated at $518.9 million. The above totals include revenues from power sales, wheeling for others, and other miscellaneous power revenues and exclude BuRec energy sales and revenues associated with project use.

The change in energy sales from FY 1983 through FY 1985 is primarily a result of record runoff on the Colorado River Basin and the Sacramento-San Joaquin River Basin in FY 1983, which resulted in greater nonfirm energy for sale in FY 1983 than initially projected. The FY 1984 estimated energy sales are based on normal river basin runoffs for the year.

Our estimated revenues are forecast to increase from FY 1983 to FY 1984 and slightly decline in FY 1985. Although energy sales reached record levels in FY 1983 and then drop to normal levels in FY 1984, the rate adjustments for the Central Valley, Collbran, and Rio Grande Projects will more than offset the decline in revenues from the additional sales of nonfirm energy, which was a result of FY 1983 record runoff levels. The slight drop in revenues in FY 1985 reflects the decline in energy available for marketing from the Colorado River Basin Project (Navajo) which will be used to meet the irrigation pumping load requirements.

Status of Water conditions in Western's Marketing Area

Water year 1983 was one of the wettest in the last 40 years. Because the extremely heavy snowpack during the spring of 1983 resulted in above-normal runoff, particularly in the Colorado River Basin, flexibility was needed in marketing excess energy from Federal hydropower plants where flood releases were made. Consequently, the Secretary of Energy delegated to the Administrator ratesetting authority for the short-term sales of excess energy during periods of high water releases.

Based on the January 1984 Water Supply Outlook for the Western United States, published by the Departments of Agriculture and Commerce, prospects are for abundant water supplies in the West's major river basins. Heavy mountain snow accumulation during the first 3 months of this water year (October through December 1983) led to January 1, 1984 runoff forecasts for the spring and summer that are well above normal. However, very little snow accumulated during January and the first 2 weeks of February 1984, which caused the runoff forecasts to slightly drop--though forecasts for most of the West's river basins are still near or above normal, which would result in above-average energy generation during 1984.

Reservoir storage is now higher in the Colorado and Sacramento-San Joaquin River Basins than it was at this time last year. Therefore, the handling of high reservoir inflows similar to those of last year could be more difficult if much above normal water conditions persist during the next several months.

As of February 1984, above-normal streamflows and hydropower generation seem likely. However, it is still too early to definitely predict that 1984 flows will equal the magnitude experienced last year in the Colorado and Sacramento-San Joaquin River Basins.

Presently, the runoff forecast for the Sacramento-San Joaquin River Basins is 100-110 percent of normal; the Colorado River Basin forecast is 140-180 percent of normal; and the Missouri River Basin forecast is generally slightly below normal except for the North and South Platte Rivers where the forecasts are between 100-135 percent of normal water conditions.

During FY 1983, the Western-wide spills and powerplant bypasses experienced as a result of last year's very high water situation were at least 21 million acre-feet of water. This amount of spilled water and powerplant bypasses represents at least 5,000 gigawatthours of lost energy generation and a conservative estimate of at least $25 million in lost hydropower sale revenues. Corresponding figures currently forecast for FY 1984 are at least 14 million acre-feet of water spills and powerplant bypasses, resulting in at least 1,400 gigawatthours of lost energy generation valued conservatively at more than $15 million of lost hydropower sale revenues. Efforts are being made to minimize these losses through more efficient coördination of these releases.

This concludes my statement of the Western Area Power Administration's FY 1985 budget request and program status.

BIOGRAPHICAL SKETCH

ROBERT L. McPHAIL
Administrator
Western Area Power Administration

Robert L. McPhail was sworn in as Administrator of the Western Area Power Administration (Western) on June 19, 1978. Western, an agency within the Department of Energy, is responsible for the marketing and transmission of 8,300 megawatts of electric power generated at 48 Federal hydroelectric powerplants and 1 coal-fired plant to over 500 wholesale power customers in 15 Western States.

Prior to his appointment, McPhail served for 5 years as the Regional Director for the Upper Missouri Region of the Bureau of Reclamation headquartered in Billings, Montana.

McPhail holds a Bachelor's and Master's of Science Degree in Engineering from the University of Mississippi. He is a registered professional engineer and has served 25 years with the Federal Government.

WESTERN AREA POWER ADMINISTRATION

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Sidney DC Tie

Question: Information given on the Sidney, Nebraska Intertie indicated that the project would cost $30 million and that it would begin almost immediately. Now, the 1985 justification material includes a request for an additional $2.1 million and construction is not expected to begin until later this summer. Why do you need an additional $2.1 million?

Answer: The additional $2.1 million is needed in FY 1985 for AC facilities to connect the DC converter station to the Federal power system. The $30 million project cost estimate covered the DC converter station contract only and did not include the AC connecting facilities and associated costs.

Question: What do you expect the total project to cost?

Answer: The total project cost is not available at this time. Western is now reviewing bid proposals for the DC converter station's portion of the project. Contract award on this portion is expected in June 1984. Pending completion of this action we would expect to be able to develop a total project cost estimate.

Question: Do you expect to request additional funds beyond 1985 and, if so, can you provide a proposed funding schedule for the record?

Answer: Yes, we expect to request additional funding beyond 1985. Upon completion of the contract award for the DC converter station we will firm up our AC facilities and associated cost requireldnts, include the necessary amounts in the FY 1986 funding request and at the same time prepare a funding schedule for the out years.

Question: What is the status of the procurement of the necessary transformers and other associated equipment?

Answer: Initial evaluation of proposals for providing electrical equipment for the Sidney DC converter has been completed. Procurement negotiations with contractors who have bid on the project are underway and we expect to complete this process and award a contract in June 1984.

Question: Provide a tabulation for the record which shows the major project milestones and expected completion dates. Also provide a narrative description of why the intertie is needed and the expected benefits and savings in terms of dollars and service.

Answer: The DC converter station construction contract is expected to be awarded in June 1984, with an in-service date of December 1986. The AC facilities construction contract is expected to be awarded in May 1985, with an in-service date of December 1986.

There is an immediate need to interconnect Western's power system in Colorado and Wyoming to the eastern power grid. Specifically, the DC interconnection is needed to provide for increased utilization of the existing AC transmission facilities on either side of the east-west split, and to increase the operational efficiency and enhance revenues of the Federal hydroelectric system by allowing the east-west exchange of energy when one system has excess hydrogeneration and the other system could use the less costly resource.

Western expects total oil and gas displacement savings from the intertie line and converter station equipment to be roughly $80-100 million, over an estimated twenty-five year life of the converter equipment. This savings is based on a full potential utilization assumption for oil and gas generation displacement, the estimated life of the converter equipment, and Western's percentage of the total shared savings with the other line participants.

It should be noted that this estimate addresses only oil and gas displacement savings. There are other types of important savings that would result from the Sidney intertie line such as increased system reliability, nonfirm energy and capacity sales. However, these savings are difficult to predict.

Rifle-San Juan 345-kV Transmission Line

Question: Are funds available to initiate construction of the single circuit 345-kV line which is planned as a joint effort between WAPA and Colorado-Ute? If not, how much would be required to initiate the project in 1985?

Answer: Yes, funds are available to initiate the project in 1985.

Question: Provide a schedule of major milestones and funding plan through completion.

Answer: The total project cost of this joint effort between WAPA and Colorado-Ute is $107 million; Western's share is $51 million. Funds available from prior years, together with the FY 1985 request, will provide 95 percent of Western's total funding requirements for the single circuit 345-kV line. The balance will be included in the FY 1986 budget request for completion of the project.

Contract awards for this project are to be made by Colorado-Ute, not WAPA. Colorado-Ute is expected to award a contract for the Rifle-Grand Junction-Montrose section construction in the fall of 1984 followed by the final award, for the Montrose-Long Hollow-San Juan section. Both sections are expected to be completed and in service by the summer of 1987.

Question: Why did the PUC deny construction of a double circuit line?

Answer: Because the PUC concluded that Colorado-Ute had not shown that the line was financially and operationally feasible in meeting the needs of its southwestern distribution members.

Question: What benefits would a double line provide?

Answer: The total capacity of a double-circuit line would be essentially twice the capacity of the proposed single-circuit line and would satisfy the area's immediate and future requirements. The double-circuit line would have provided some 1000 MW of additional capacity for the systems in the area. The environmental impact, real estate requirement and dollar investment would have been less for a double-circuit line than for two single-circuit lines.

Question: What impact will there be with only a single circuit line?

Answer: The single-circuit line will provide system transmission capacity sufficient to satisfy the area's immediate and near-term requirements. However, it is likely that the systems in western Colorado and northwestern New Mexico will eventually require the construction of additional lines.

Staffing Reduction

Question: What impact will the reduction of 4 FTE's have on WAPA's program? How do you expect to accomplish this reduction?

Answer: The decrease in FY 1985 staffing represents Western's share of staff reductions resulting from the Management Initiatives Program. The reductions are targeted for Western in the areas of organization and staffing management. These initiatives are designed to improve the efficiency and effectiveness of Western's management systems, improve current operations, and improve planning and contol of Western's organization structure. Areas examined include supervisor-to-employee ratios, number of levels of supervision, and overall staff utilization. Western continually examines its total available staffing resources and their allocation throughout the agency in accordance with the position management policies set forth in OMB Circular A-64. Through these practices, we will achieve the desired reduction.

Maintenance Backlog

Question: Is there any critical maintenance work that should be accomplished in FY 1985 that will be backlogged because of inadequate funding?

Answer: No, Western's FY 1985 budget request will allow accomplishment of critical maintenance work.

Aircraft Savings

Question: Can you provide for the record an analysis of the benefits and savings which have been realized from the purchase and operation of the jet aircraft recently purchased by WAPA?

Answer: In October 1983, on the basis of its speed, efficiency, and short takeoff and landing capability at high altitudes typical of those in Western's service area, Western purchased and placed into operation a used 1981 Cessna Citation 550. Although Western has logged over 57,000 nautical miles during the first five months of operation, it is difficult to extrapolate annual cost savings since this operation occurred during the winter when construction, operation, and maintenance activities are at a low level of activity.

This aircraft has enabled Western to manage its program more efficiently and maintain more effective customer relations by enabling key personnel to travel throughout Western's service area more quickly than is possible using commercial transportation connecting to remote areas. For example, commercial travel to our Watertown Operations Office, South Dakota, from Golden, Colorado takes about 10 hours compared to about two hours with Western's aircraft.

Reception and Representation Fund

Question: The budget proposed new appropriations language authorizing WAPA to use $1,500 for official reception and representation expenses. Has this reception and representation fund been authorized by the appropriate legislative committee?

Answer: Western has not previously requested funds to cover official reception and representation expenses. Specific statutory authority for this type of fund is typically obtained through appropriation language.

Question: Why do you find it necessary to have such authority?

Answer: Western frequently interacts with customer groups and foreign officials involved in the electric power marketing and transmission business. As a result of this interaction, Western should reciprocate in occasionally hosting official functions which require expenses that should not be borne as out-of-pocket expenses by Federal employees. This fund will permit Western to maintain relationships of value with its customers and others in the electric utility industry.

Helicopter Acquisition

Question: Explain the need for an additional new helicopter which is being requested in the 1985 budget.

Answer: This new helicopter is needed to meet Western's power marketing and transmission requirements in the eastern two-thirds of North Dakota and parts of Minnesota. It will be used primarily for patrol of transmission lines and to support construction activities patrolled by chartered, fixed-wing aircraft. This helicopter will also enable Western's engineers to make more frequent inspections of contractor activities, construction inspections, and safety reviews at remote work sites.

Question: How much will this helicopter cost?

Answer: Our estimated acquisition cost of the helicopter is $432,000.

Question: Did you analyze the option of contracting for the use and/or the operation and maintenance?

Answer: Yes. An informal analysis using OMB Circular A-76 cost comparison techniques was performed to assure ourselves that in-house ownership and operation costs are comparable to commercial operations. This analysis indicated it is less costly for Western to own and operate the helicopter than to lease. We expect to accomplish maintenance by contract.

Question: What would be the impact if an additional helicopter is not provided?

Answer: Western would continue to use fixed-wing aircraft for line patrol in parts of North Dakota and Minnesota. The use of fixed-wing aircraft is not as effective and efficient as helicopters for patrol and emergencies because of poorer visibility, higher flying speed, and inability to land fixed-wing aircraft for closer inspection or repair of facilities. As a result, trouble spots on transmission lines can be missed or crews must be transported to work sites via vehicles, which can increase costs through lost time and delay restoration of service to customers.

Purchase Power and Wheeling Increase

Question: Explain why your appropriations request for purchase power and wheeling is increasing from $43 million to $90 million.

Answer: Although Western's purchase power and wheeling request for FY 1985 is an increase, for comparison purposes, a more accurate base is $68 million, which includes carryover from FY 1983 and is the amount available to Western for expenditure in FY 1984. The $22 million increase, from $68 million to $90 million, is mostly attributed to increased costs to the Central Valley Project for energy imports from the Pacific Northwest and increased charges for capacity purchases; an additional $2.1 million for increased costs of energy purchases on the Pick-Sloan Missouri Basin Program because of higher rates; and an additional $1.6 million for energy purchases for the Parker-Davis Project. The increased Central Valley Project costs will be offset by increased revenues, resulting from power rate adjustments recently approved by the Federal Energy Regulatory Commission on a final basis.

Question: What is the impact on your program if the $36 million of credit billing is not obtained?

Answer: Western would not be able to satisfy all contractual commitments for the delivery of firm power to Central Valley Project power customers within the funds requested. However, if favorable water conditions continue in California and the Northwest area, the need for credit billing will decrease.

STATEMENT OF WILLIAM H. CLAGETT, ACTING ADMINISTRATOR, SOUTHWESTERN POWER ADMINISTRATION

It is a pleasure to appear before you today to present the FY 1985 budget request for the Southwestern Power Administration (Southwestern). I will summarize the major program areas of this request, and discuss some of our accomplishments. A summary of the request follows:

	1984 Appropriation	1985 Request	Change
Operation and Maintenance	$ 9,800,000	$ 10,168,000	$ 368,000
Purchase Power and Wheeling	22,729,000	22,400,000	<329,000>
Construction	3,700,000	3,700,000	--
Total	$ 36,229,000	$ 36,268,000	$ 39,000
Use of Prior Year Balances		7,000,000	
Prospective Management Savings		60,000	
Appropriation Request		$ 29,208,000	

Southwestern's budget level represents an increase of $39,000 or one tenth of a percent.

OPERATION AND MAINTENANCE SUMMARY

The FY 1985 budget request of $10,168,000 for Operation and Maintenance represents an increase of $368,000 or 3.8% from the current year level. This activity provides for the marketing and administration of the power program, operation of the transmission system, maintenance of all physical facilities and general program management.

This change reflects an increase in our labor costs for our wage hour employees and other minor increases in costs for communications, and supplies.

PURCHASE POWER AND WHEELING

The request of $22,400,000 for Purchase Power and Wheeling is less than the current year but covers four months of critical year conditions, an improvement over the 3-1/2 month coverage provided by FY 1984 funding. This improvement comes as a result of the expiration of the Reynolds Metals Contract and the resale of that power under new contracts which reduce SWPA energy sales commitments from 2400 hours per year for each kilowatt of capacity, to 1200 hours per year. The conversion of this contract reduces the energy Southwestern is obligated to deliver in any one year by 180 million kilowatt hours or a savings of $4 million in power purchases in a critical year. Thus, we are able to lower our funding request and still cover our needs for a greater period of time.

CONSTRUCTION

The funding request of $3,700,000 for construction represents the same level of effort as the current year. This activity provides funding for capital equipment and inventory, and minor modifications to the transmission and communication systems necessary to maintain the reliability and the adequacy of the Government's portion of the area electric utility grid. Transmission planning studies have begun in order to identify alternatives to a transmission loading and low voltage condition on our system in the Northeastern Arkansas and Southeastern Missouri area. These studies are being conducted in cooperation with the utility systems connected to or serving the area.

FUNDING OF FY 1985 REQUEST

Southwestern's request consists of $29,208,000 in new appropriations with the remainder being funded by $7,000,000 in 1983 carryover deferred until 1985 and $60,000 from management savings.

The 1983 carryover is derived from savings available by holding negotiated wage increases for our hourly employees to the Presidential pay cap applicable to all Federal employees, the ceiling placed on GSA rates for office space rental, reduced Purchase Power and Wheeling expenses resulting from good water inflow conditions, and minor construction project savings.

STAFFING

Southwestern's request for staffing reflects a reduction of 3 FTE's in 1984 and an additional 9 FTE's in 1985 for a total 6% reduction. These savings will be accomplished by converting work previously done by Federal employees to accomplishment by the private sector through contracts.

RATES

Timely adjustments in rates to recover costs impacted by inflation have been the key to keeping Southwestern's repayment status current. In addition to other rate increases implemented in FY 1979 system rates were increased 38% or $25 million annually, and special rates for the Sam Rayburn project were raised 23% during FY 1983. A transmission wheeling rate increase of 22% was filed with the FERC to be effective April 1, 1984. Collectively these rate adjustments have substantially improved Southwestern's financial condition. These rate increases were necessary to comply with the mandate of Section 5 of the Flood Control Act of 1944 to recover the costs of producing and transmitting power.

We are currently preparing new rate studies to submit to the Federal Energy Regulatory Commission this spring. It appears no rate adjustments will be necessary for both the system and the Sam Rayburn project for the immediate future.

FINANCIAL PROGRESS

Southwestern has continued to meet its financial repayment responsibilities. In 1982 and 1983 sales were $68.4 and $81.5 million with net revenues available for repaying the investment of $14 and $10 million respectively. To date Southwestern has repaid $40 million of its $742 million investment with the majority of that coming in the last six years. The steady improvement in repayment has come about by reducing Thermal Energy Purchases through the renegotiation of contracts from high energy commitments to 1200 hours peaking sales, and a full commitment to achieving periodic rate adjustments.

Our auditors, Coopers & Lybrand, Certified Public Accountants audited Southwestern and the Corps of Engineer's accounting and financial records for 1983 and have again issued a non-qualified accounting opinion. We are pleased that in three audit years, three clean opinions have been issued.

MISSION

The Southwestern Power Adminstration carries out the responsibilities assigned to the Secretary of Energy pursuant to Section 5 of the Flood Control Act of 1944, and Section 302 of the Department of Energy Organization Act. These acts authorize the transmission and sale of power and energy produced at 23 hydroelectric projects constructed by the Corps of Engineers with an installed capacity of 2,147,800 kilowatts. This power is marketed in the six states of Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas. Southwestern has 1660 miles of transmission facilities constructed to integrate the projects and market the power.

Southwestern's headquarters is located in Tulsa, Oklahoma, with an engineering and operation center, and a maintenance unit in

Springfield, Missouri, and maintenance units located in Muskogee and Ada, Oklahoma, and Jonesboro, Arkansas.

MARKETING PLANS

During FY 1984, Southwestern executed 12 new contracts involving 39 municipals and four rural Generation and Transmission cooperatives which in turn supply 52 distribution cooperatives. This completes the marketing of 263,000 kW's of capacity from the Harry S Truman and Clarence Cannon hydro projects in Missouri and power becoming available with the expiration of the AP&L/Reynolds contract. Southwestern is proud to announce that the Section 5 criteria of "wide spread use" has been achieved by these new contracts expanding sales into the states of Kansas and Louisiana. It is a credit to the Municipal, Cooperative and Investor Owned Utilities that they were able to contract for wheeling and utilization arrangements to receive this power on schedule. Negotiations are still underway to complete the long term sale of power to be sold in Texas. This power is now being marketed under an interim agreement.

COMMITTEE INTEREST

This committee will be pleased to learn that Southwestern is making good progress in the implementation of changes that will reduce the level of funding for thermal energy purchases without detriment to the program. To this end Southwestern has expanded energy banking arrangements and is converting contracts from full load to peaking as they expire. The expiration of the Reynolds contract will also reduce the need for purchasing thermal energy.

EXPANDED ENERGY BANKING

Southwestern has significantly expanded its ability to bank surplus hydro energy available during heavy inflow conditions.

The maximum amount of banking energy to be exchanged was contractually increased from 350 million to 750 million kilowatt hours. This means that, in heavy rainfall conditions, Southwestern now can put surplus energy into these banks in lieu of selling it on the open market. During drought conditions this energy is drawn from the banks in lieu of purchases. The prime differential between selling excess hydro at 3.5 mills versus deferring purchases at 27 mills is a net gain of 23.5 mills per kilowatt hour or $17 million on the total banking quantity of 750 million kW hours. These banking arrangements are the most efficient and the only long term equivalent to a water storage system available to a hydro power operator.

CONTRACT EXPIRATIONS

In 1985 and 1987 contracts serving high energy, full load factor requirements totaling 213,300 kW will be expiring. These customers have been notified that upon expiration of their contracts this power will be resold to them as peaking or low energy commitment. These new contracts will save 3,000 hours of energy per kilowatt of capacity or a saving of approximately 640 million kilowatt hours per year. A saving of approximately 400 million hours will be achieved at the end of FY 1985 with the remainder following in FY 1988. Recognizing that these changes will take place in the next four years, the equivalent effect in today's dollars of deferred purchased thermal energy is $17 million of reduced exposure during a critical year.

Collectively, the staff has responded to the committee's continued interest and while some of these actions take time, Southwestern is working on holding down funding for the Purchase Power and Wheeling activity.

WATER AND CONSERVATION

The value of Southwestern's hydro system lies in its use of capacity, but the annual production of energy cannot be overlooked as an oil conservation tool, and as a measure of the wise use of the nation's natural resources. The 5.2 billion kilowatt hour average annual hydro production is equivalent to 10 million barrels of oil with a total value of $290 million at today's prices. Wise development and use of our nation's resources has a real payback.

NEW HYDRO POTENTIAL

The Southwestern Power Administration has conducted studies and supported installations of power in 17 proposed Corps multipurpose projects with a combined total capacity of about 856,000 kW. The projects are in various stages of planning with two projects, Town Bluff Dam and Belton Dam, both in Texas, already authorized.

LITIGATION

Last year Southwestern informed this committee that a long standing contract dispute with the Associated Electric Cooperative, Inc. of Missouri had been renegotiated prospectively beginning in 1981 and that negotiations had been agreed upon to settle the retroactive period 1970 to 1981. We are pleased to announce that, in January 1984, the Court approved the terms of settlement thus ending 14 years of litigation.

As mentioned at last year's hearings, Southwestern was sued for $12 million by the Reynolds Metals Company, under the allegation that during the recent years of the contract Southwestern had been marketing surplus hydro energy to preference customers rather than to Reynolds as required under their interpretation of the contract. In June 1983 Southwestern settled by agreeing to a judgment of $10.1 million.

No significant developments have taken place regarding other litigation identified in the budget.

SUMMARY

Mr. Chairman, Southwestern's budget request represents a continuation of the present program, with no real increase in funding. This stable level also reflects the power marketing direction to reduce energy commitments thereby depending less on thermal energy purchases.

Southwestern is continuing to practice sound financial management as demonstrated by frequent rate reviews and necessary increases; positive annual contributions to repayment; changes to the contracts reducing the need to purchase thermal energy to support the hydro system; and the maintenance of good financial records as demonstrated by three consecutive good CPA audit opinions.

Mr. Chairman, it is a privilege to come before your committee as Acting Administrator and be associated with the employees and customers of Southwestern Power Administration.

BIOGRAPHICAL SKETCH

William H. Clagett was appointed Acting Administrator of the Southwestern Power Admnistration (SWPA) in Tulsa, Oklahoma, effective January 27, 1984. The appointment was made by Department of Energy Secretary Donald Hodel. During this interim appointment, Clagett retains his position as Deputy Administrator of the Western Area Power Administration in Golden, Colorado. He expects to devote nearly full time to his duties at SWPA.

Clagett graduated from Oregon State University in 1962 with a bachelor of science degree in business and technology. He began his Federal career with the Bonneville Power Administration (BPA) in Portland, Oregon, in 1962. In 1966, he was assigned to the Area Office of BPA in Idaho Falls, Idaho, as an electrical engineer. He was named Area Manager at Idaho Falls in 1970. The following year, he was appointed Assistant Administrator of BPA in charge of its Washington, D.C. office.

He remained with BPA until transferring to the Western Area Power Administration as Deputy Administrator on July 19, 1978. He presently is chairman of the Western Systems Coordinating Council and a member of the board of trustees of the North American Electric Reliability Council.

Clagett is maintaining his home address in Littleton, Colorado. His immediate family are his wife, Brenda, and two children, Kimberly and William H. Clagett V, who are students at the University of Wyoming.

Southwestern Power Administration is a regional agency of the U.S. Department of Energy with responsibility for marketing Federal hydroelectric power in Kansas, Missouri, Oklahoma, Arkansas, eastern Texas, and Louisiana.

SOUTHWESTERN POWER ADMINISTRATION

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Management Savings

Question: The budget justification shows a program reduction of $60,000 in management savings for 1984 and $232,000 in prospective management savings in 1985. How do you plan to realize the $60,000 in savings for 1984 and the $232,000 proposed for 1985?

Answer: Southwestern is now evaluating actions which can be taken to reduce staffing needs through management initiatives. These initiatives are designed to improve efficiency and effectiveness of Southwestern's management systems, improve current operations, and improve planning and control of its organization structure.

Question: What will be the impact on the marketing effort if these management savings cannot be found?

Answer: Although Southwestern anticipates that the savings will be achieved, they are unable to predict the impact on any specific program area at this time. However, they would not take any action that would adversely affect their marketing effort.

Additional FTEs

Question: How will the 2 additional FTE positions be used?

Answer: The 2 additional positions will be needed for the increased workload of the Branch of Substations related to the increased maintenance responsibility resulting from the acquisition of 4 switchyards from the Corps of Engineers.

Question: Why is an electrician leader needed at this time and how has this work been handled in the past?

Answer: In order to perform the additional maintenance of the four extra switchyards, and only add a minimum number of members to the crew size, the crew will occasionally be split into smaller crews for short periods of 2 or 3 days. During these times, an experienced crew member will assume the leadership responsibility, without becoming a formal supervisor, for the technical work that must be accomplished. Electrical operation and maintenance work has been performed using 7-man crews, including journeymen electricians, under direct supervision. Depending on the work requirements, these crews may be split up into 3-4 member groups under the supervision of "electrician leaders." No change in this method of operation is planned.

Reallocation of Funds

Question: Do you foresee any major program changes that could require the reallocation of the funds requested in the 1985 budget?

Answer: At this time, the only program change that could require the reallocation of the funds requested in the 1985 budget is the possible cancellation of the sale of 277 miles of transmission facilities in Oklahoma. Western Farmers Electric Cooperative, with whom GSA has been negotiating the sale, is having second thoughts on this purchase. If Western Farmers decides not to purchase, Southwestern will need anywhere from $2 to $3 million in funds to upgrade and put the facilities back into use. This work is not a part of the FY 1985 budget request. These facilities have been given only critical maintenance during the 4 years the disposal has been in progress; consequently, they are in poor condition. There is at least half a million dollars worth of work that should be done immediately.

Current Water Conditions

Question: What is the current water condition in the Southwestern Power service area?

Answer: Water inflow conditions for the first half of FY 1984 are excellent and have been above (150%) median since September 1983. Presently reservoirs are completely full and flood operations are in effect at many of the power projects.

Purchased Power

Question: The budget justification shows purchased power requirements of $22.4 million based on a 4-month critical water condition and $32.3 million for a 6-month condition. If you assume critical water conditions will last longer than 4 months, would the additional funds be requested by the Administration in a supplemental?

Answer: Yes Sir. Assuming that banking arrangements have been exhausted, and that the funds for power have been used up, Southwestern's likely alternative would be to request the needed funds through a supplemental appropriation because of the large amounts of money required. Usually the need for these additional funds is not known until late in the fiscal year. It is unlikely, therefore, that Southwestern would still have sufficient unobligated funds remaining in other program areas to cover such an expense.

Power Sales Contracts

Question: Update the Committee on SWPA's efforts and activities to renegotiate power sales contracts?

Answer: All available power, including that which will become available from the two new projects, Harry S. Truman and Clarence Cannon, is now under contract. The allocation to Texas was accomplished under interim arrangements pending completion of contract negotiations. The firm power contractual arrangements that expire between 1985 and 1987 are now in the negotiation process and new contracts will be signed prior to FY 1988. The new contracts will provide for sales of energy at 1200 kilowatthours per year per kilowatt of capacity as compared with some 4300 kilowatthours per year per kilowatt of capacity under the old contracts, thus reducing the Government's need to purchase thermal energy and allowing the customers to use the Government's power to meet their peak demand requirements.

Question: What level of funding is requested for 1985, how does this compare with the 1984 level, and is it your professional opinion that the 1985 request is adequate to carry out this work in an efficient manner?

Answer: The 1985 funding level for Southwestern Power Marketing Division, which among other things is responsible for negotiation and administration of power sales contracts, is $1.7 million, which is slightly higher than that in the 1984 budget. The requested funding level will be adequate to accomplish the effort planned for FY 1985.

Critical Maintenance Work

Question: Is there any critical maintenance work that should be accomplished in FY 1985 that will be backlogged because of inadequate funding?

Answer: No Sir. The funding level requested for maintenance is adequate to keep the system at a reliable operating level, unless the Western Farmers Electric Cooperative decides not to acquire the 277 miles of transmission lines in Oklahoma.

Statement of Harry C. Geisinger, Administrator, Southeastern Power Administration

It is a pleasure to appear before you today to discuss Southeastern Power Administration's (SEPA) proposed budget request for fiscal year 1985.

FY 1985 BUDGET

An appropriation of $35,744,000 is requested in the President's 1985 Budget to effectively carry out Southeastern's mission in a 10-state area of the Southeast. The requested FY 1985 appropriation represents an increase of $15,150,000 over the amount appropriated for FY 1984.

A comparison by activities of the FY 1985 Operations and Maintenance budget request with the amounts appropriated in FY 1984 is as follows:

	FY 1984	FY 1985	Difference
System Operation and Maintenance	$1,751,000	$ 1,904,000	+$ 153,000
Purchase Power and Wheeling Charges	18,843,000	33,840,000	+14,997,000
Total Budget Authority	$20,594,000	$35,744,000	+15,150,000

JUSTIFICATION OF INCREASES

The request of $1,904,000 for the System Operation and Maintenance activity will provide funds for the negotiation and administration of wheeling and power sales contracts; development and review of rates to assure repayment of power costs; scheduling the generation of power and supervision of power deliveries; and direction and support of Southeastern's power marketing program. This amount represents a $153,000 increase over the amount available in the current year.

Of this increase, $111,000 is required for pay adjustments, statutory within-grade increases, and additional personnel benefit costs. The remainder is required to provide for nominal increases resulting from higher administrative costs for support functions (travel, transportation of materials, GSA rental, communications, printing and reproduction, and supplies and materials).

The request provides funding for the purchase of additional ADP equipment, software, and associated costs to enhance existing computer support and to improve billing operations, provide more reliable and timely financial data, and to perform complex hydrological and project operations studies. The funding is also required to replace office equipment which has been in service for long periods of time.

Accomplishment of the program objectives for FY 1985 anticipates continuation of the current employment level of 41 fulltime equivalents, although the projects in operation, the amount of power sold, and the number of customers served will increase.

PURCHASE POWER AND WHEELING

The major portion of the budget request, $33,840,000, is required for the Purchase Power and Wheeling activity and represents a $14,997,000 increase over the amount available in the current year.

Funds provided for the purchase of power and wheeling are used only to pay amounts charged the Government under contractual arrangements for (1) delivery of power over non-Federal systems to load centers of preferred agencies for the account of the Government; and (2) purchase by the Government of energy to firm up Federally-generated power to the load factor required by preferred agencies, to provide support capacity required to meet commitments from the Jim Woodruff Project under adverse water conditions, and to defray other costs under drought conditions.

In the absence of ownership or operation of transmission facilities, Southeastern carries out its marketing program by utilizing the existing transmission systems of the power utilities in the area. This is accomplished through "wheeling" arrangements between Southeastern and each of the area utilities who have transmission lines connected to the projects under which the utility agrees to deliver specified amounts of Federal power to customers of the Government and SEPA agrees to compensate the utility for the wheeling service performed.

While the law specifies that Southeastern give preference in the sale of its power to public bodies and cooperatives, Southeastern has not been able to market all elements of its power to preference customers in the past. Power not sold to the preference customers was sold to the utilities who perform the wheeling services for Southeastern. A "net-billing" process was instituted which provided that the amounts owed the utilities by Southeastern for wheeling were offset by the amounts owed Southeastern by the utilities for purchased power with the remainder being paid by the owing party. Under this arrangement, Southeastern needed only minimal appropriations to cover only those amounts where Southeastern would be the owing party after net billing.

Southeastern's new power marketing policies for its respective systems anticipate that all available power, both capacity and energy, will be sold as peaking power to preference customers to more completely comply with the law, with no sales to the non-preference utilities who provide wheeling services. Southeastern is proceeding at an intensive level to negotiate and execute contractual arrangements implementing the policies. Under these arrangements, there will be no money owed to Southeastern by the private utilities, and it will be necessary with each contract consummated to assume payment of wheeling charges not only for existing power sold to preference customers but also the additional amount previously sold to wheeling utilities. Until this process is completed, significant increases in funding requirements will occur for several years into the future. The necessary increases for wheeling will be promptly offset by similar increases in power receipts deposited in the U. S. Treasury by Southeastern.

New or revised contracts providing for the sale of all power to both existing and new preference customers which are expected to be in effect during FY 1985 cover the following Southeastern sales:

1. That portion of the power produced in the Georgia-Alabama System of Projects and now sold within 150 miles of the Hartwell Project in the Duke Power Company service area.

2. That portion of the power produced in the Cumberland River System which is proposed to be wheeled outside the TVA service area as well as that portion to be sold within the TVA service area.

3. All power produced in the Kerr-Philpott System and now marketed in the Virginia Electric and Power Company and Carolina Power & Light Company service areas.

4. That portion of the power produced in the Georgia-Alabama System of Projects and sold in the Southern Company service area (Georgia, Alabama, Mississippi, and Florida).

OVERVIEW

Southeastern Power Administration, with headquarters in Elberton, Georgia, markets hydroelectric power from projects constructed and operated by the U. S. Army Corps of Engineers and located in 10 southeastern states. Southeastern has no transmission lines and accomplishes the delivery of power by wheeling agreements with power utilities in the area that have the necessary transmission facilities.

Southeastern presently markets power from 21 multiple-purpose projects to 194 power purchasers. Estimated power revenues for FY 1985 are $113,700,000, reflecting the sale of 3,092 megawatts of installed capacity with 7.4 billion kilowatt-hours of energy. These estimates are based upon the availability of the new generating unit at the Hartwell Project and the conventional generating units at the Richard B. Russell Project.

Southeastern's overall repayment status is as follows: from inception in 1950 to September 30, 1983, estimated operating revenues available for repayment totaled $1,053,644,000. These estimated revenues were allocated to payment of $384,711,000 of annual operating expenses, $397,733,000 of interest expense, and $271,200,000 of capital investment in electric plant. The total estimated capital plant on September 30, 1983, of $1,010,842,000, less the amount repaid, leaves a balance of $739,642,000 to be repaid.

SEPA's projects are grouped for marketing purposes into systems which are financially independent of each other. Presently there are four such systems which will continue into the future, with Laurel Project (Kentucky) operated separately for the short term. The power systems, customer locations, and status of wholesale rate adjustments are hereinafter discussed. SEPA has accomplished all of its recent rate adjustments with a minimum of difficulty.

GEORGIA-ALABAMA PROJECTS

The Georgia-Alabama Projects are comprised of the Allatoona, Buford, Carters, Clarks Hill, Walter F. George, Hartwell, Robert F. Henry (formerly Jones Bluff), Millers Ferry, and West Point projects. Two of the four units at Carters are pumping units. Power from the system is sold to customers located in Georgia, Alabama, North and South Carolina, Mississippi, and Florida.

Power rates for this system were approved on an interim basis by the Assistant Secretary, Conservation and Renewable Energy, on August 29, 1983, for a period ending September 30, 1984. These power rates, which were effective October 1, 1983, have been filed with the Federal Energy Regulatory Commission for approval on a final basis.

The fifth generating unit at the Hartwell Project became operational in November 1983 providing an additional 80,000 kw of capacity to the existing 264,000 kw plant during Fiscal Year 1984.

Construction on the Richard B. Russell Project is over 87 percent complete and is scheduled for initial generation in late 1984. The four conventional power units, which will have a capacity of 300,000 kw, are scheduled to be online during FY 1985 and the four pump-storage units, which will provide an additional capacity of 300,000 kw, are scheduled to have power-on-line during FY 1989 and FY 1990.

The addition of the 680,000 kw of generating capacity within these two projects represents the most significant increase in the marketing product of Southeastern Power Administration since 1975.

CUMBERLAND BASIN PROJECTS

The Cumberland Basin Projects include the Wolf Creek, Center Hill, Dale Hollow, Old Hickory, Cheatham, Barkley, J. Percy Priest, and Cordell Hull projects. The projects are located on the Cumberland River or its tributaries and are all in northern Tennessee and southern Kentucky.

System power is marketed to customers located in the Tennessee Valley Authority area and in portions of Kentucky, Indiana, and Illinois. Power rates for this system were approved on an interim basis on May 31, 1983. The Federal Energy Regulatory Commission approved these rates on October 26, 1983, for a period beginning July 1, 1983, ending June 30, 1984.

As indicated, it is anticipated that a ninth project, Laurel, now operated as an individual project, will be included within the Cumberland system when the new policy is implemented.

KERR-PHILPOTT PROJECTS

Power from the John H. Kerr and Philpott projects, located in the Roanoke River Basin in Virginia, is marketed to customers in Virginia and North Carolina. Power rates increased for the preference customers served by the Carolina Power & Light Company and the Virginia Electric and Power Company. On March 3, 1983, the Assistant Secretary for Conservation and Renewable Energy approved on an interim basis the rate increase effective April 1, 1983, for a period ending September 30, 1986. The Federal Energy Regulatory Commission approved these rates on a final basis on July 6, 1983.

JIM WOODRUFF PROJECT

The Jim Woodruff Project is located on the Apalachicola River on the Georgia-Florida state line. All dependable capacity available at the Project is sold to preferred customers in peninsula Florida.

Revised power rates for the Jim Woodruff Project were approved on a interim basis by the Assistant Secretary for Conservation and Renewable Energy and were placed in effect on August 20, 1982. Final approval of the rates was issued by the Federal Energy Regulatory Commission on January 10, 1983, for a period ending August 19, 1987.

POTENTIAL ADDITIONAL RESOURCES

SEPA has been coordinating with various District offices of the Corps of Engineers in examining the feasibility of installing generating units at several existing projects in the area within which SEPA has marketing responsibility and selected projects outside the area.

The potential hydropower projects examinations that Southeastern will be performing during fiscal year 1985 include but are not limited to the following:

(1) the replacement of the William Bacon Oliver Lock and Dam in Alabama, (2) the B. Everett Jordan Project in North Carolina, (3) the Charity pumped storage project in Virginia, (4) the Summersville and Tygart projects in West Virginia, (5) four existing reservoirs in the Green River Basin in Kentucky, (6) the Celina Project on the Cumberland River, (7) locks and dams on the Ohio River, (8) projects in the Lehigh River Basin in Pennsylvania, and (9) the addition of hydropower to existing projects in Indiana and Ohio.

POWER MARKETING POLICY FORMULATION

As previously reported to the Committee, Southeastern has been deeply involved in the formulation of new written power marketing policies for its several systems, involving broad public participation in their development, to systematically replace previous ad hoc approaches to power marketing. Major issues requiring attention in each instance include marketing area, allocations of power, handling of pumped-storage energy, utilization of area utility systems, wholesale and resale rates, and conservation measures. The major goal of each policy is to market all available power to preference agencies to more completely comply with the law.

Southeastern has published final marketing policies for its ten-project Georgia-Alabama System and its nine-project Cumberland System. Additionally, an interim policy for the two-project Kerr-Philpott System is in effect. A revised proposed long-term policy has been issued and all public input has been completed. Following staff evaluation of all oral and written comments, Southeastern expects to issue and publish a final power marketing policy for its Kerr-Philpott System during FY 1984. Policy action with respect to the Jim Woodruff System is not anticipated in the near future.

All SEPA power marketing policies contain the guidelines, including proposed marketing areas and allocation formulas, for marketing the available power for approximately the next ten years.

POWER MARKETING POLICY IMPLEMENTATION

Contractual arrangements, implementing new marketing policies on a near-term basis, have been negotiated and placed into effect with preference customers and private utilities within the service areas of Duke Power Company, Carolina Power & Light Company, and Virginia Electric and Power Company.

All capacity and energy available is sold to preference customers as anticipated by the policies. Because no power is sold to the private utilities to effectuate "net-billing", Southeastern must rely on appropriations authorized to accommodate the new policy arrangements. As other such arrangements are negotiated and placed in effect, additional appropriations will be needed to pay for the wheeling services provided by the contracting utilities, so long as appropriations are utilized to meet the Government's contractual commitments.

Intensive negotiations of contracts which will implement new power marketing policies for the Cumberland System and the Georgia-Alabama System (Georgia, Alabama, Mississippi, and Florida) are in progress.

With respect to the Cumberland System, this is the first real opportunity to consider the overall area that SEPA might serve. The proposed area consists of the TVA area and those utility areas which join the TVA area which SEPA is not now serving or considering serving from its other systems.

LITIGATION

I would like to bring the Committee up-to-date with respect to recent actions affecting pending litigation.

SOUTHEASTERN POWER ADMINISTRATION V. KENTUCKY UTILITIES COMPANY, BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

SEPA has been unable to voluntarily obtain a reasonable wheeling contract with Kentucky Utilities Company to permit marketing of 25,000 kilowatts of Cumberland power to eight municipalities served from its system. An application to FERC seeking an order to require the Company to provide the wheeling service under recently enacted sections 211 and 212 of the Federal Power Act was denied by the Commission on November 8, 1983, in its Opinion 198. On December 8, 1983, SEPA filed a Request for Rehearing asking the Commission to reconsider its opinion. On February 3, 1984, the Commission denied rehearing. Since the Commission will not order wheeling, SEPA will try again to persuade the Company to cooperate in carrying out the new written power marketing policy for the Cumberland System which also provides for service to the municipalities.

GREENWOOD (MISS.) UTILITIES COMMISSION V. DOE and SEPA

On October 21, 1983, Judge Wilbur Owens, Jr., of the United States District Court for the Middle District of Georgia issued an order for Defendants dispositive in nature. The Court ruled that Greenwood was not entitled to a compensatory allocation of power and that its claim for prospective relief had been rendered moot by SEPA's new Cumberland System marketing policy. The Court retained jurisdiction pending implementation of SEPA's Cumberland policy which proposes an allocation of Cumberland power to Greenwood. Plaintiffs subsequently filed motion to amend (and effectively reverse) the judgment. The motion was denied by the Court on November 22, 1983. On January 23, 1984, Greenwood filed a Notice of Appeal to the United States Court of Appeals for the Eleventh Circuit. SEPA, through the Department of Justice, will seek to sustain the District Court's order.

ELECTRICITIES OF NORTH CAROLINA, ET AL., V. SEPA AND DOE

On January 6, 1984, following denial of Defendants Motion to Transfer the case from the Eastern District of North Carolina, Raleigh, to the Middle District of Georgia, Macon, SEPA headquarters District, the principal parties stipulated to a schedule, later adopted by the Court, which would dispose of the case on cross motions for Summary Judgment. All filings were scheduled to be completed by May 29, 1984. The Court has under consideration, however, Intervenor Defendant's request for limited discovery which may have an effect upon the schedule originally ordered by the Court.

The suit was filed by ElectriCities of North Carolina, et al., on July 29, 1982, on behalf of approximately 60 of its member North Carolina and Virginia municipals and two South Carolina municipals. It originally attacked both SEPA's final Georgia-Alabama marketing policy and its more recently issued Interim and Revised Proposed Long-Term Policy for the Kerr-Philpott System as not being in accord with the statutory criteria set forth in Section 5 of the Flood Control Act of 1944. Following the filing of a Motion to Dismiss by Defendants, the count relative to the Kerr-Philpott System policy was dismissed from the suit. The surviving count against the Georgia-Alabama System policy specifically attacks the marketing areas proposed and method of allocation. Additionally, it attacks SEPA's four-system approach to power marketing in the Southeast in favor of a single-system approach for the entire 10-state southeastern area of the United States.

SUMMARY

Mr. Chairman, in conclusion, the budget request for FY 1985 anticipates continuation of the power marketing program in the Southeast at an intensified pace with additional resources to be marketed and an increase in customers served with no increase in manpower levels. Southeastern will vigorously pursue its marketing activities and I, along with a dedicated staff of qualified employees, look forward to meeting the challenges that lie ahead.

BIOGRAPHICAL SKETCH

Harry C. Geisinger became the fifth Administrator of the Southeastern Power Administration on November 30, 1981, having been appointed to that post by Secretary of Energy James B. Edwards.

Established in 1950, the Southeastern Power Administration markets federal hydroelectric power produced at Corps of Engineers' constructed projects in the States of Georgia, Florida, Alabama, Mississippi, North Carolina, South Carolina, Kentucky, Tennessee, West Virginia, and Virginia. Based in Elberton, Georgia, Southeastern presently markets power produced at 21 multiple-purpose projects with installed capacity of 2,712,375 kilowatts.

Prior to his appointment, Geisinger owned Geisinger Advertising and Public Relations in Atlanta. He has also served as president of Carbon Fuels, Inc., in Atlanta, and as president of Uniway of East Tennessee, Inc., in Blountville, Tennessee.

Geisinger served in the Georgia House of Representatives from 1968 through 1974 and was minority whip from 1970-1974.

He received an associate of arts degree at Lincoln College in 1958 and later studied business administration at the University of Cincinnati. He served in the U. S. Navy from 1953-1957.

Born in Cincinnati, Ohio, in 1932, he is married to the former Patricia Virginia Capdau of New Orleans. The couple has three children and reside in Dunwoody, Georgia, where Mr. Geisinger has been active in community and youth activities.

SOUTHEASTERN POWER ADMINISTRATION

QUESTIONS SUBMITTED BY SENATOR HATFIELD

ADP EQUIPMENT JUSTIFICATION

The budget justification indicates that funds are being requested for the purchase of additional ADP equipment, software, and associated costs.

Question: Explain in more detail why this equipment is needed and why the existing situation is unacceptable.

Answer: Increases in workload associated with additional resources to be marketed, additional customers served, and a more direct role in the operation of the Cumberland System of Projects without manpower increases necessitate the automation of a number of tasks now performed manually. The funds requested are required to enhance ADP communications between Southeastern's computer system and other systems for monitoring project operations, transferring data between Southeastern and its customers, and to automate tasks currently performed manually to provide improved internal controls and more reliable and timely data.

The existing situation is unacceptable for several reasons. Southeastern's mini-computer system was purchased initially to perform billing functions and serve as a word processor. However, other applications, particularly in the power operations, rate, and repayment areas, have been added to the system. Additionally, automation of a number of administrative activities now appears cost effective.

Currently Southeastern lacks the capability to transfer, via telecommunications, ADP data between Southeastern's computer system and operating hydro projects, other power administrations, public and private utilities, and other computer systems. Presently, there are no computerized means by which engineers, accountants, technicians, and others can plot or show in graphic form results of computer studies, reports, and operating records. Input-output access to the computer system is limited due to the number of available terminals and the current computer operating system limitations.

The equipment and software purchases anticipated by the request will provide sufficient capacity and necessary communication capability for the immediate future.

Question: Can this work be accomplished by contract services? If not, why?

Answer: No, not competitively. Southeastern has investigated the possibility of leasing or renting equipment, as opposed to purchase, and has determined that over a 5-year period significant savings could be realized through purchase. Additionally, Southeastern has considered the possible performance of major items of program work through contract service remote from its headquarters and, based upon its consideration, has determined that satisfactorily and timely accomplishment of such work would likewise result in significantly higher costs than performance of the work through use of purchased equipment.

Question: Provide for the record a detailed breakout of the type of equipment being purchased showing the cost and the type of equipment being replaced, if any.

Answer: The proposed equipment and estimated costs include hardware purchases, consisting of communications equipment, terminals, and other peripherals, $25,000; software purchases, including operating system upgrade and accounting system, $30,000; and associated costs, $3,000. The proposed purchases will enhance the present computer system rather than replace existing equipment.

Question: What are your future plans regarding ADP purchases?

Answer: With the proposed additions, Southeastern's computer system will have the capacity, storage, and telecommunications hardware and software necessary to meet Southeastern's ADP demands for the immediate future. The only additional purchases anticipated will be replacement of obsolete equipment and purchase of equipment for unique tasks that may arise in the future that are not anticipated at this time. These purchases would be minimal.

POTENTIAL RESOURCES

Question: Explain why Southeastern is examining potential hydroelectric projects as far North as Pennsylvania and as far West as Ohio and Indiana. Are your service areas limited by law?

Answer: Southeastern's service area is not proscribed nor limited by law. The Secretary of Energy has nationwide authority for power marketing and carries out his responsibilities through the several power marketing administrations. At present there is no Federal marketing agency located in the area East of the Mississippi and North of the Ohio and Potomac Rivers; therefore, responsibility for study of any proposed Federal power in this area for feasibility and marketability belongs to the Secretary of Energy. The Secretary, through his Office of Power Marketing Coordination, has assigned to the Southeastern Power Administration the task of providing the U.S. Army Corps of Engineers feasibility and marketability studies of projects under consideration in the area that is East of the Mississippi and North of Southeastern's normal 10-State region.

Question: How much is budgeted for these studies in 1985?

Answer: There are no funds in Southeastern's budget assigned to this item, rather it is essentially an addition to existing activities with minimal cost generally associated with additional travel and communications.

CUMBERLAND MARKETING

Question: Can you explain how Southeastern interfaces and coordinates its marketing functions with TVA? How can Southeastern propose to serve the TVA area?

Answer: At present, TVA has complete operating control of the Barkley, Center Hill, Cheatham, Cordell Hull, Dale Hollow, Old Hickory, J. Percy Priest, and Wolf Creek Projects located on the Cumberland River in Tennessee and Kentucky except for certain quantities of capacity and energy which Southeastern withholds for marketing to four generating and transmission cooperatives in this area. Southeastern coordinates the scheduling of the cooperatives' needs through the TVA operation center. TVA reimburses Southeastern for the scheduled repayment of the projects based on the inflow of water rather than generation. Credits are allowed TVA for the quantities of capacity and energy which Southeastern withholds to supply its commitment to the cooperatives.

Under the proposed marketing plan, significant quantities of capacity, of which TVA has a surplus, together with minimum quantities of energy, which TVA could use, are to be withdrawn from the TVA system to expand the delivery of Government power into Mississippi, western North Carolina, and unserved areas of Kentucky in accordance with the mandate in section 5 of the Flood Control Act of 1944 to ". . . encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles. . . ." Scheduling of the power through the TVA operations center would continue, and distribution to the periphery of the TVA system would be over TVA transmission lines for which TVA would receive a suitable wheeling fee.

The remainder of the capacity and energy generated from the Cumberland system would remain in the TVA system for TVA's distribution to preference customers in TVA's area.

LITIGATION

Question: Can you review for the record the history and issues relating to the litigation with the Kentucky Utilities Company? What is the potential impact on the consumer and budget of FERC's actions denying to order wheeling services?

Answer: More than 10 years ago, Southeastern proposed to market the output of the 70 megawatt Laurel Project in Kentucky within a radius of 150 miles of the Project in a geographical area jointly served by Kentucky Power Cooperative and Kentucky Utilities Company. Southeastern proposed to dispose of approximately one-half of the available power to the cooperative, which serves numerous distribution cooperatives, and to deliver the other approximately one-half to the company to be wheeled to eight municipalities owning their own distribution systems and served from the company's system. The cooperative readily agreed to the arrangement but the company after some 5 years of negotiations was unwilling to consider the arrangement except upon anticompetitive, unreasonable conditions. Southeastern then tried to substitute 25 megawatts of superior quality power from the Cumberland system for Laurel power but the company was likewise not willing to agree to a reasonable wheeling agreement. Utilizing newly enacted sections 211 and 212 of the Federal Power Act, added by PURPA, Southeastern sought an order from FERC requiring Kentucky Utilities to wheel. FERC denied the request on the ground that a wheeling order would disrupt existing competitive relationships in violation of section 211(c)(1) of the Federal Power Act. As a result the municipalities are required to continue to purchase all of their requirements from the company, being denied the benefits of cheaper Southeastern power. Consumers on the eight municipal systems are denied savings of up to an estimated $600,000 per year. By selling the power to East Kentucky in the interim or to TVA for some time into the future, Southeastern's budget requests for wheeling would be reduced by approximately $1,044,000 per year.

STATEMENT OF ROBERT J. CROSS, ADMINISTRATOR, ALASKA POWER ADMINISTRATION

I appreciate the opportunity to report on Alaska Power Administration's progress and our FY 1985 budget proposals.

We are requesting $3,233,000 in FY 1985 appropriations, or 5% below the 1984 amounts. The request provides adequate funds to continue APA's responsibilities for the Eklutna and Snettisham hydroelectric projects and $100,000 to continue phasing out our investigations work.

The main new items are a proposal to automate the Eklutna Powerplant and shift to net billing for the operator's contract at Snettisham.

The automation would be started in FY 1984 under a reprograming action which has been presented to your committee. Total costs are estimated at $1,130,000, including $836,000 from prior year appropriations and $294,000 in our FY 1985 request. The automation will allow us to shift from a fully attended plant to one where operations can be handled remotely by supervisory control.

Our net billing proposal would use revenues to cover the costs of a contract for non-Federal operators for the Snettisham Project. This reduces our FY 1985 budget requirements by $250,000 with a comparable reduction in receipts to the Treasury.

Other aspects of our budget request are quite routine.

MISSION

APA is responsible for operation, maintenance, transmission, and marketing for Alaska's two Federal hydroelectric projects. These are the 30 MW Eklutna Project serving the Anchorage and Matanuska Valley areas since 1955, and the 47 MW Snettisham Project, the main power source for Juneau.

Eklutna now provides roughly six percent of the electrical energy requirements for its market area and also provides valuable wheeling and peaking services. Snettisham provided 76 percent of the requirements for its market area in FY 1983.

APA has also conducted investigations programs in water and power development which are now being phased out. These programs have made many important contributions to recent, non-Federal power development in Alaska, but further Federal funding for this type of work in Alaska is not considered necessary.

MARKETING AND RATES

The two projects produced and marketed 329 million kilowatt hours during FY 1983 with gross revenues of $4.6 million, both records for APA. We estimate a further increase in revenues to $7.2 million for FY 1985, reflecting full use of available firm energy and power from both projects and rate adjustments.

Our report last year mentioned plans to increase Snettisham rates so as to end the period of interest deferrals at that project. That adjustment became effective December 1, 1983. We also plan a rate increase at Eklutna at the end of FY 1984, so as to maintain that project's good repayment record.

OPERATION AND MAINTENANCE

We are pleased to report a successful year for the operation and maintenance programs. We had no significant operating problems or emergencies. The $200,000 in emergency funds appropriated last year remain available.

The justification material lists the several items in our major maintenance and replacement program in FY 1983 and FY 1984. Key items include the upgraded transmission line maintenance for Snettisham, several items to upgrade communications systems, and purchase of new static exciters for installation at Eklutna.

EKLUTNA WATER PROJECT

Eklutna Lake has been selected by Anchorage as the water source for a long-term public water supply project. The water project, scheduled to begin operations in 1988, will divert a portion of the water now available for power production at Eklutna hydroelectric project. The latest estimates indicate about an 8% reduction in Eklutna energy production by the year 2000, and a 20% reduction by 2025.

We have negotiated an agreement with Anchorage which provides for compensation for the reduced energy in kind and without cost to APA and our power customers. With the agreement, there will not be any significant changes in amounts of power and energy available to APA for marketing, so the water project will not have adverse impact on project repayment or on amounts and value of power and energy available to our customers.

Anchorage is seeking an amendment to the Eklutna Project Act which will permit their use of part of the water reserved in that Act for the power project. We support Anchorage on this amendment, based on the compensation agreement.

CRATER LAKE UNIT

As reported previously, the Snettisham market area has urgent need for power and energy from the Crater Lake unit. This will increase the firm energy available from Snettisham by 60%, covering power demands that would otherwise be met from oil-fired generators.

The Corps of Engineers has essentially completed designs and has received the necessary approval to begin construction this year. We will continue to work with the Corps towards expeditious completion.

INVESTIGATIONS

The justification materials summarize completion of most of the APA study work started in prior years.

Perhaps the most important is the series of studies on potential interties between the Snettisham Project, other parts of Southeast Alaska, and neighboring areas of Canada. This work indicates that portions of a Southeast Alaska grid are feasible, and that a region-wide grid may be justifiable within a few years.

Our 1985 request enables us to maintain some in-house planning capability primarily to assist in working out the details of a possible merger of the State and Federal power programs in Alaska.

COMBINATION OF STATE AND FEDERAL POWER PROGRAMS IN ALASKA

My testimony last year indicated APA's intent to work with our State counterparts and other interested parties toward a specific proposal for combining the State and Federal power programs in Alaska under State ownership. Such action would require enabling Federal and State legislation. I am convinced that this item is desireable for the Alaskan situation which involves a small, essentially single-purpose power program and a new State power program pursuing similar objectives.

We have not yet proceeded beyond informal discussions because of some higher priority issues in the State program. Those issues include action toward licensing and construction of new projects and long-term financing arrangements for projects now coming on line.

We intend to go into detailed discussion of this issue as soon as the State is prepared to do so.

I want to add that our 1985 request is premised on continuing our present responsibilities and provides adequate funds to do that well.

Mr. Chairman, this concludes my report, and I would be happy to answer questions.

BIOGRAPHICAL SKETCH

Mr. Cross was appointed Administrator of the Alaska Power Administration in June 1976. He has been on the Alaska Power Administration (APA) staff since the agency was formed in 1967. He was a staff engineer in the APA Planning Division between 1967 and 1973, and Planning Division Chief from 1973 to 1976.

Mr. Cross entered Federal Service in 1956 as a hydraulic engineer with the Bureau of Reclamation. Between 1956 and 1967, he had planning assignments with Reclamation in Colorado, Wyoming, Nebraska, and Alaska, with a 2-year break for active service in the U.S. Army.

Mr. Cross is 50, and a native of Lincoln, Nebraska. He attended public school in the states of Nebraska, Washington, and New York, and is a Civil Engineering graduate from the University of Colorado. Cross has been a resident of Juneau, Alaska since October 1964.

ALASKA POWER ADMINISTRATION

QUESTIONS SUBMITTED BY SENATOR HATFIELD

Status of Combining State and Federal Programs

Question: Explain in more detail the current status of efforts to combine State and Federal power programs in Alaska.

Answer: Thus far, the efforts have not progressed beyond informal discussions with Alaska Power Administration's (APA's) customers and various State officials. APA advised the State that they would like to examine the issue in detail as soon as the State is prepared to do so. APA's State counterparts want to settle some financing and marketing problems associated with four new State projects before taking up the question of merging the Federal and State programs. The State Administration and Legislature are working hard on marketing contracts and a new legislative package which can settle this current financing problem and pave the way for financing future projects like Bradley Lake and Upper Susitna. When this is completed, APA expects detailed work can begin towards a specific proposal to combine the two programs.

Question: What are the pros and cons to the Federal power marketing effort?

Answer: The Federal power program in Alaska has been effective in terms of efficient operation of the two projects and defining future power and transmission programs that should be pursued. The Federal efforts have provided substantial help to the new State power development programs. These are valuable pros.

The cons involve reasons why it appears more sensible for the State to take over the Federal power program in Alaska. The State has taken the lead in financing and developing new power projects and transmission facilities. Combining the existing small Federal program with the small but growing State program should result in a single, more efficient and stronger program that is better able to handle the challenges of the future.

Automation of Powerplant Operations

Alaska Power Administration plans to shift the operations of the Eklutna powerplant and the Snettisham plant to remote supervisory control and contract operations in 1985.

Question: What benefits and savings do you expect from this change?

Answer: The Snettisham plant is now operated by remote supervisory control at the Thane substation in Juneau. By contract a local utility provides operators on a round-the-clock basis, 365 days per year, at a cost of about $250,000. This benefits both APA and the local utility because, in effect, the operators are dispatchers for the entire Juneau area power system. The change at Snettisham is a proposed net-billing arrangement beginning in FY 1985.

The new proposal is to automate the Eklutna powerplant by installing a Supervisory Control and Data Acquisition (SCADA) system at an estimated cost of $1,130,000. The system should be fully operational by early 1986.

The automation of Eklutna is expected to result in a net reduction of three FTE's by the end of FY 1986 and net annual savings of $253,000 by 1987. Installation cost of the SCADA system should be recovered in five years.

By contract a local utility will provide routine monitoring of Eklutna operations by remote control when automation of the Eklutna powerplant is complete.

Question: In your professional opinion, could project maintenance be provided by contract services? Please explain.

Answer: OMB asked APA to review possibilities and feasibility of contracting out additional functions, but APA has not yet come up with specific recommendations. On the operations side, APA has had a good success at Snettisham in contracting out the real-time operations and monitoring functions. This is the operator on duty 24 hours a day. APA handles in-house the other operations functions such as scheduling, agreements with interconnected systems, operating criteria and orders, and has standby operating capability in case of failure of the supervisory control system.

Similarly, APA now contracts portions of the maintenance activities when that appears to be most advantageous, but has in-house capability to handle inspections, corrective maintenance, trouble-shooting and repairs, and responses to emergencies. These same people handle most of the routine, preventative maintenance, portions of which may be suitable for contracting out in the future.

Snettisham Transmission Facilities Upgrade

Question: What is the current status of work to upgrade the transmission facilities related to the Snettisham Project?

Answer: Several things are being done that will help get the best possible reliability for the Snettisham transmission facilities. APA is continuing a carefully designed and quite intensive inspection and maintenance program for the line which was first implemented in 1982. This is the best defense against major tower failure such as occurred in March of 1982. They are also taking action to improve the protective relay system and correct a line charging problem. Plans are being made to complete an engineering study to find the best solution to the line charging problem in 1984.

Question: What work is planned for 1985?

Answer: The Alaska Power Administration will continue the inspection and maintenance program in 1985. Other specific activities will depend largely on results of the study on the line charging problem.

Construction Status of Bradley Lake

Question: What is the current status of State plans to construct the Bradley Lake project?

Answer: The State has completed all the necessary work to support the application for a Federal Energy Regulatory Commission license for the Bradley Lake Project, and plans to submit the license application this year. The State Administration and Legislature are working on financing plans. Construction may start in 1985 or 1986.

Conservation and Renewable Energy Programs

Question: Several of the other PMA's have on-going programs in the conservation and renewable energy area. What is APA doing to assess the contribution these alternatives may provide in meeting your future energy demands?

Answer: Over the last several years, APA completed a number of important studies in conservation and renewable energy areas through its General Investigations program. That work included a series of transmission studies to examine improved use of hydro resources, investigation of small hydro potential in remote areas, some wind resource appraisals, heat pump investigations, and evaluation of opportunities to substitute hydro energy for oil. They have also assisted in administration of DOE and State grant programs in appropriate technology, biomass conversion, and micro hydro applications. With phase out of APA's general investigations program, future work in conservation and renewable energy will be limited to efforts to obtain best efficiency in production and use of power from the two operating projects.

Future Power Requirements

Question: Could you provide for the record a forecast of APA's future power requirements and how you plan to meet the demand?

Answer: It is important to remember that Alaska Power Administration provides only about eight percent of Statewide power requirements, with the balance being supplied by utility systems. Over the next several years, the State program will begin to supply a significant portion of the requirements.

The current requirements are around four billion kilowatthours per year and are expected to double over the next 10 to 20 years. The Crater Lake unit of APA's Snettisham Project will cover growing requirements in the Juneau area through the early 1990's, but the balance of future requirements will have to be met by State and utility programs. Studies indicate that the Bradley Lake and Susitna Projects plus interconnections in Southwest Alaska may be the most important measures to meet the expected requirements.

SUBCOMMITTEE RECESS

Chairman HATFIELD. The subcommittee will recess subject to call of the Chair.

[Whereupon, at 3:25 p.m. Wednesday, March 28, the subcommittee was recessed to reconvene at 10 a.m. Monday, April 2.]

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